

**IMPACT ANALYSIS OF THE
TEFRA SYSTEM FOR REIMBURSEMENT
OF PPS-EXCLUDED HOSPITALS**

Final Report

by:

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1.0 BACKGROUND

Prior to the Tax Equity and Fiscal Responsibility Act of 1982 (TEFRA), the payment method for all Medicare inpatient hospital stays was retrospective cost-based reimbursement. The regulations that were part of TEFRA represented an expansion of the constraints on inpatient routine care operating costs known as the "Section 223 Limits," first applied in 1974.

For one year, fiscal year 1983, Medicare's ten million inpatient discharges were paid on the basis of TEFRA. TEFRA established a per discharge target amount, placing reimbursement limits on total operating costs and extending the so-called "Section 223 limits" to constrain both routine and ancillary costs. Hospital costs were reimbursable up to a limit which was the lesser of a hospital-specific cost target and a peer group target. There were seven peer group categories based on bedsize and urban or rural location.

Then, beginning in October 1983, more than 90 percent of discharges shifted to the Prospective Payment System (PPS) based on DRGs. Research attention has naturally shifted to the impact of PPS on DRG-based hospitals and beneficiaries. TEFRA remains of interest, however, because of the approximately 337,800 discharges at facilities excluded from the PPS which continue to be paid under TEFRA. These are rehabilitation, long-term, children's and psychiatric hospitals and rehabilitation and psychiatric distinct-part units of general hospitals.

After one year under TEFRA, the peer group limits were eliminated and hospital payment was constrained only by a hospital-specific target amount. This target amount is updated each year by an inflation adjustment. TEFRA facility and distinct part units are allowed to keep 50 percent of the amount by which costs fall below the target amount, up to a maximum of 5 percent of the target amount. If costs run above the target amount, the facility is responsible for all of the overrun.

Excluded facilities were exempted from PPS because it was believed that both the types of care provided and the settings for this care are unsuited to a rate system based on national averages. The national database used for creating DRGs either did not include or under-represented these groups.

Originally substance abuse hospitals and distinct part units were also exempted from PPS. The substance abuse DRGs were revised and beginning in fiscal year 1988, were included under PPS.

1.1 Description of Excluded Facilities

Table 1-1 shows the number of excluded facilities and the number of Medicare discharges from these facilities for the years 1984-1987.

Psychiatric facilities are two-thirds of all excluded facilities and account for 65 percent or 218,000 out of the 337,800 Medicare discharges from excluded facilities in 1987. Both the number of psychiatric hospitals and the number of distinct-part psychiatric units has grown by 32 percent between the years 1984 and 1987.

Rehabilitation facilities account for another 31 percent of Medicare discharges from excluded facilities. The number of rehabilitation hospitals has increased from 49 to 84, a 71 percent growth, in the period between 1984 and 1987. The number of Medicare discharges from rehabilitation hospitals has grown by a more modest 41 percent in the same period. The number of rehabilitation distinct-part units has expanded from 308 units in 1984 to 535 units in 1987, a 74 percent growth. Medicare discharges from these units have more than doubled from 30,000 in 1984 to 71,000 in 1987.

Long-term care hospitals have remained relatively constant in number over the 1984-1987 period. These facilities account for less than 4 percent of Medicare discharges from excluded facilities. Discharges from these facilities have actually been declining over this period. In 1987 there are one-third less Medicare discharges from these facilities than there were in 1984.

Children's hospitals account for less than one percent of all Medicare discharges from excluded facilities in 1987 (2,140 patients). The number of children's hospitals has increased by 28 percent, from 47 in 1984 to 60 hospitals in 1987. Medicare discharges have increased by 56 percent in this time period.

TABLE 1-1

NUMBER OF MEDICARE DISCHARGES FROM PPS EXCLUDED FACILITIES 1984-87

TYPE OF FACILITY	1984		1985		1986		1987	
	N	Discharges	N	Discharges	N	Discharges	N	Discharges
<u>Psychiatric</u>								
Hospitals	439	59,660	481	63,800	515	75,625	578	80,480
Units	722	61,890	762	92,800	906	102,190	950	137,775
<u>Rehabilitation</u>								
Hospitals	49	23,545	68	21,300	79	29,800	84	33,255
Units	308	30,145	386	47,620	473	59,220	535	71,010
<u>Long-Term Care</u>	84	21,700	86	21,455	92	13,265	87	13,140
<u>Children's</u>	47	1,375	53	1,790	55	2,275	60	2,140

Source: Langenbrunner, Jack C., et al., "Developing Payment Refinements and Reforms Under Medicare for Excluded Hospitals," HCFA, Spring 1989, Vol. 10, No. 13.

The following four sections describe each type of excluded facility, the rationale for exclusion from PPS and the criteria for exclusion.

1.1.1 Psychiatric Hospitals and Distinct-Part Psychiatric Units

Psychiatric services are for the study, treatment and prevention of mental disorders. These services, when provided in an inpatient setting, are oriented towards the improvement or maintenance of functioning. Psychiatric diagnoses include organic and affective disorders, schizophrenia, other psychoses, non-psychotic conditions, acute situational and personality disturbances and alcohol and drug-related problems (Lave *et al.*, 1988).

The major concern that provided the motivation to exclude psychiatric facilities from PPS was the "fairness" of DRGs (Jencks, *et al.*, 1984). Psychiatric facilities are believed to treat more severe cases within any of the psychiatric DRGs. In addition, public psychiatric hospitals provide long-term custodial care for the mentally impaired and patients with organic disturbances. To pay for all psychiatric cases under a system of uniform DRG weights would thus be inequitable and could result in treatment decisions being based on reimbursement rather than the patient's medical needs.

Fairness of PPS in the context of psychiatric discharges was studied using simulation methods since discharges at these facilities were not paid by DRGs. Freiman *et al.*, (1987) found that differences in facility type (i.e., PPS-exempt unit in general hospital or psychiatric hospital versus a PPS eligible hospital), were still associated with significant cost differences after controlling for DRG and other PPS payment factors. Other researchers have also documented the problem of paying the same average cost per diagnostic category to different types of facilities (Taube *et al.*, 1984, McGuire, Dickey *et al.*, 1987, English *et al.*, 1986).

Psychiatric hospitals qualify for exclusion from Medicare's PPS if they meet the following criteria: a provider agreement with Medicare; treatment of only those patients with a principal admission diagnosis contained within the American Psychiatric Association's Diagnostic and Statistical Manual (DSM-III); a program directed by a board-certified psychiatrist; provision of

psychological and social work services; supervision by a registered nurse qualified in psychiatric nursing; and provision of a treatment plan for patients developed by a team consisting of at least a physician, a psychologist, and a psychiatric nurse. Psychiatric distinct-part units must meet the same requirements and in addition they must maintain the units as separate cost entities, with separate medical and financial records (HCFA, 1987)

1.1.2 Rehabilitation Hospitals and Distinct-Part Rehabilitation Units

Rehabilitation services generally begin after the acute phase of treatment and are designed to treat functional limitations and disability. Rehabilitation is intended to restore individuals who are incapacitated by illness, congenital defects, or accident, to their highest level of functional ability (Gornick and Hall, 1988). Individuals over the age 65 make up the large majority of rehabilitation cases (Hosek, et al., 1986).

A primary reason for excluding rehabilitation facilities from PPS is that a rehabilitation patient's diagnosis does not seem to be an adequate indicator of treatment needs. Rehabilitation diagnoses include stroke, brain injury, spinal cord injury, neurological disorder, hip fracture, back disorder, arthritis, amputation, and cardiopulmonary disorder. Researchers argue that the resources expended on rehabilitative care are more responsive to measures of patients' functional status than to diagnosis (Langenbrunner et al., 1989; Hosek et al., 1986). Hosek et al., (1986) found that diagnostic category, wage index, and indicators for surgery and teaching status explained only 12 percent of the variation in total charges in rehabilitation facilities. They conclude that the current DRG criteria are not appropriate for rehabilitation facilities.

Rehabilitation hospitals must meet the following criteria to qualify for a PPS exemption: have a provider agreement with Medicare; be primarily engaged in furnishing intensive rehabilitative services during the hospital's most recent cost reporting period for an inpatient population of whom at least 75 percent required treatment for one or more of ten specified conditions

(e.g., stroke, spinal injury); have a director of rehabilitation who is a physician with at least two years of rehabilitation experience; have a preadmission screening procedure in place; use a multidisciplinary team approach; provide close medical supervision and therapy services; and have a treatment plan that is established, reviewed, and revised as needed by a physician in consultation with other professional personnel. Rehabilitation distinct-part units must meet these criteria and in addition provide for separate bookkeeping for the unit (HCFA, 1987).

1.1.3 Long-term Care Hospitals

Long-term care hospitals are broadly defined by HCFA as any hospital with an average inpatient length of stay of over 25 days. About one-third of these facilities are chronic disease hospitals for the care of persons seriously or terminally ill. The remaining two-thirds include rehabilitation, psychiatric, pulmonary disease, and other types of specialty and general hospitals. (For our analyses, hospitals which are both psychiatric and long-term hospitals or both rehabilitation and long-term hospitals are considered either psychiatric or rehabilitation facilities, as appropriate.) Patients cared for in long-term care hospitals are not acutely ill but also not sufficiently independent of life-sustaining technology to be cared for in a traditional nursing home (Langenbrunner, et al., 1989).

Patients treated in long-term hospitals are typically in the second half of a treatment episode that has included an acute care inpatient stay. One argument for excluding long-term hospitals from PPS is the concern that "separate and uncoordinated payments based on prospectively set rates for both hospital stays, without substantial regulatory controls on the appropriateness of the second hospitalization would introduce strong incentives to provide the least care in both hospital settings" (Langenbrunner, et al., 1989). In other words, without an integrated utilization review and payment program, there are incentives to undertreat when two distinct settings are reimbursed separately for one combined treatment episode. Each treatment setting wants to shift costs onto the other.

Another concern which motivated the exclusion of long-term hospitals from PPS was that because of the diversity of long term care settings, the structuring of a single PPS for these facilities would mean inequities across both types of settings and geographic location. Langenbrunner *et al.*, (1989) argue that a managed capitated reimbursement system would offer the best approach for chronically or terminally ill patients treated in these settings.

Criteria for exclusion from PPS for long-term care hospitals are simply that the hospital has a provider agreement with Medicare and that the average inpatient length of stay is more than 25 days (HCFA, 1987).

1.1.4 Children's Hospitals

Children's hospitals encompass three types of settings: freestanding children's hospitals; university teaching hospitals with pediatric residency; and community hospitals with pediatric residency. In 1984, over half (55 percent) of the patients treated were between the ages of one and fifteen. Another 27 percent were sick newborns, and the remaining patients were sick infants other than newborns (Payne and Restuccia, 1987).

Medicare covers relatively few children. The majority of those that are covered are under the "end stage renal disease" (ESRD) program. Others covered under Medicare are disabled children and dependent children of adults who are covered under the ESRD program under Medicare. The majority of children treated by Medicare (82 percent) are treated in PPS-eligible hospitals (Payne and Restuccia, 1987).

There are various reasons given for excluding children's hospitals from PPS. These reasons fall into two categories: First, DRG's are inadequate for classification of children; and second, childrens' facilities treat a more severe caseload within diagnostic category. DRG's are said to be inadequate for children because for some diseases children have different clinical presentations than adults and often require different types of treatment. Some examples are: Hunter's and Hurler's syndromes, Pomp's disease, cystic fibrosis, complex congenital heart disease, asthma, leukemia, and meningitis. In addition, the DRG age categories may be too rigid or crude for children.

Moreover, children's hospitals were not included in the data bases used to develop DRG's and costs are higher when treatment is performed in children's hospitals versus PPS-eligible hospitals. Differences in costs are most striking among neonates (DRGs 385-390). Children's hospitals are both more expensive within DRG's and treat a higher proportion of more complicated DRG's, such as extremely premature neonates, than do PPS-eligible facilities (Payne and Restucci, 1987).

There are three criteria that a children's hospital must meet in order to qualify for exclusion. First, the hospital must meet Medicare's definition of a hospital. Second, the hospital must have a provider agreement with Medicare. Finally, the hospital must have the "predominant" number of their inpatients under 18 years of age, based on the hospital's most recently filed cost report (HCFA, 1987).

1.2 Previous TEFRA Impact Research

Most of the reimbursement research that has been performed on excluded facilities has focussed on alternative payment options. Options considered include modifications of TEFRA or PPS and capitation. The limited impact work that has been done has concentrated almost exclusively on psychiatric facilities. As mentioned above, psychiatric facilities make up about two-thirds of the excluded facilities and accounted for 65 percent of all discharges reimbursed under TEFRA in 1987 (Langenbrunner, *et al.*, 1989).

CHER researchers recently studied the impact of the TEFRA payment system on excluded psychiatric facilities only for 1986 and 1987 (Cromwell, Harrow, and McGuire, 1989). TEFRA's impact on the Medicare program, hospitals and society as a whole were examined. The updated target amount was assumed to be what costs would have been in the absence of TEFRA. In other words, the target amount was used as the basis for comparison of actual experience under TEFRA. The difference between the target amount and actual average cost was used as a measure of social savings under TEFRA. This savings has two components, the facility's gain (loss), so-called TEFRA margins, and Medicare's gain (loss). The difference between Medicare's actual payment per

discharge and average cost measures the facility's gain or loss under TEFRA. Medicare's gain (loss) is the difference between the target amount and Medicare payment.

CHER researchers found that for psychiatric facilities, average cost has risen faster than the updated target amount, therefore no resource utilization savings can be credited to the TEFRA payment system for society as a whole. However, they also find that Medicare program costs, or outlays may have fallen as the result of TEFRA, due to the asymmetric relation between average payments and average costs in TEFRA. TEFRA penalizes facilities dollar-for-dollar when costs exceed the target amount. However, when average costs fall below the target amount, Medicare appropriates at least half the gain. Psychiatric facilities experienced losses from payment levels below average cost in both 1986 and 1987. Losses were higher in 1987 because average costs grew at a rate exceeding the target amount.

Fox and Bracken (1988) also examined the impact of TEFRA on psychiatric facilities. They use Medicare Cost Report data on psychiatric hospitals for fiscal years 1983, 1984 and 1985. Missing data on some key elements limited their study sample to 107 facilities. (CHER researchers had 109 public and 197 private psychiatric hospitals in their study sample.) The purpose of the investigation was to compare Medicare payments under TEFRA to what they would have been under a simulated PPS system for these hospitals. The PPS system simulated was one where the DRG payments were calculated based on hospitals in their sample only. In some simulations, a hospital-specific system was analyzed, and in an alternative model, the hospital's rate was blended with the sample average. No discharge-level data were available, and the authors assumed case-mix remained constant at each facility. The hospital's base rate was taken to be the 1983 target amount. Applying the PPS update factors for later years led the authors to assume that the per discharge payment under the hospital-specific PPS was simply the target amounts for later years.

Comparing TEFRA payments with the simulated PPS (the target amounts), Fox and Bracken found that average payments were less than target amounts by the third year and conclude (p. 3) that "...TEFRA incorporates effective incentives for hospitals to reduce costs." As we will see below, this

conclusion is unjustified. Because of the asymmetric treatment of gains and losses under TEFRA, Medicare payments can on average fall below the target amount without any cost reduction by facilities.

Finally, Hadley and Swartz (1989) study the effects of rate regulation (i.e., TEFRA, PPS, or state-specific systems), competition, and area insurance coverage on acute care hospital costs for the years 1980 through 1984. Unlike the other studies reviewed above, their analysis was not limited to PPS-excluded hospitals. Controlling for many factors, including a time trend, the authors find that hospitals under TEFRA had 7 percent lower total costs than non-regulated hospitals. PPS reduced costs by 12.5 percent. These reductions are particularly large, keeping in mind that Medicare discharges average less than 40 percent of the cases at the studied hospitals.

In summary, little is known about the impact of TEFRA on excluded facilities, with the exception of psychiatric facilities. We are aware of the substantial growth in the number of these facilities over the last few years. The number of Medicare patients treated in these facilities has also grown, more Medicare patients are receiving the benefit of inpatient rehabilitation and psychiatric services. This report attempts to take a look at TEFRA's financial impact on excluded facilities.

2.0 DATA AND METHODS

2.1 Introduction

The primary source of data for our analysis of the financial impacts of TEFRA is the 1985-87 PPS Exempt Hospitals and Excluded Units file. This database provides us with cost and utilization information for all excluded facilities. Additional analytic variables were merged onto this file from several other sources. The following sections describe the PPS-excluded facility file, the additional data items, the data cleaning process and the construction of some of the variables used to classify facilities.

2.2 1985-87 PPS Exempt Hospitals and Excluded Units File

This file contains hospital cost report data for PPS-exempt hospitals and excluded units. The Medicare cost reports in the file are those with cost reporting periods on or after October 1, 1984 and before October 1, 1988. Hospitals included are those specialty hospitals excluded from the Prospective Payment System (PPS): rehabilitation, long term care, psychiatric and children's hospitals, as well as alcohol/drug hospitals which later become included under PPS. Also in the file are cost report data for all distinct part units of hospitals excluded from PPS. These facilities are all reimbursed by Medicare under the TEFRA payment system. There are over 5,400 records on the file. About two-thirds of these records contain information for PPS-exempt units of general hospitals. The number of unique providers is less than 5,400 however, since most providers have more than one record, either because multiple cost reporting periods are provided, or information for the same reporting period is provided, both before and after an audit.

The Medicare cost reports on this file contain information on costs and utilization that enable the Medicare program to determine reasonable costs and TEFRA payment amounts for these PPS-excluded facilities. The utilization data include information about the number of bed days and discharges both for

Medicare and for total utilization. Inpatient operating cost data include routine and special care service costs as well as breakdowns of a hospital's or unit's costs and charges by ancillary cost centers.

Also included on this file are data that enable us to examine how well facilities have faired under TEFRA. Specifically, this information includes the target amount, the incentive payment, and the allowable inpatient cost plus incentive payment.

A considerable amount of cleaning and editing was necessary to prepare an analytic file from this database. The first step in the process was to create a smaller file which contained only rehabilitation, long term care and children's facilities. Then, duplicate records were eliminated for those providers with both pre- and post-audit data for a single time period. The record with the best cost report status was retained for further analysis. More specifically, if a provider had two different records for a given reporting period; one record had a cost report status of "as submitted" and one had a cost report status of "settled with audit," the latter record would be kept.

Adjustments for Differences in Cost Reporting Periods

There is no standard cost reporting period for all providers. Fiscal years begin on different dates. Some cost reporting periods are not equal to 12 months. Adjustments were made for these differences in the data.

Providers with cost reporting periods that are not equal to one year were handled in the following way. If two or more partial year records for the same provider are dated consecutively, then the cost and utilization information were added together and one single record was created which has a fiscal year that begins when the first record had begun and a fiscal year end date that is the same as that for the second record. Records with cost reporting periods of less than six months were dropped. Provider records with fiscal years that are not equal to 12 months but are at least six or more months, were prorated either upward or downward so that the cost and

utilization data could be compared with 12-month reports. For example, a record with a nine month reporting period has had all cost and utilization flow data multiplied by 12/9.

Each provider begins its fiscal year at a different date. For the purposes of our analysis, we classified an observation for a provider into a particular year according to its fiscal year end date. Therefore, a hospital record with a fiscal year that began January 31, 1985 and concluded January 30, 1986 is considered 1986 data, although most of that period is within the year 1985. A hospital record with a fiscal year beginning January 1, 1986 and ending December 31, 1986 would also be considered 1986 information, although the time period is nearly one year later than the previous example.

No within-year inflation adjustments were performed for this TEFRA impact analysis. Adjustments are not necessary because the focus for this analysis is a comparison between providers' average cost and target amount. Since both the target amount and average cost are based on the individual providers' cost reporting period, different reporting periods across providers will not affect how they fare financially.

Analytic File Creation

The next step in the cleaning of the data was to divide the file into the three types of facilities: rehabilitation, long-term care and childrens. At the same time this file was made smaller by eliminating all but fiscal year 1986 and fiscal year 1987 data. These two years, 1986 and 1987, alone represent 77 percent of the records for rehabilitation facilities, 81 percent of the records for long-term care hospitals and 76 percent of the children's hospital records in the PPS-excluded facilities file.

At the same time that these two smaller files were created, additional hospital-level variables were merged on from several sources including the HCFA FY1987 Impact Analysis Public Use File, the 1985 Provider of Service File and the 1983 and 1984 American Hospital Association (AHA) Surveys of Hospitals. For the purposes of our analyses, the following variables were taken from these sources:

- urban/rural designation
- region
- bedsize
- residents per bed.

Urban/rural designation, region, and residents per bed are all variables that were originally on the FY1987 Impact Analysis File. This file only contains PPS-eligible facilities, therefore, information is only available for exempt rehabilitation units of general hospitals, since general hospitals are included in this file. Residents per bed information is not available for the hospitals. Urban/rural designation and region were obtained from other sources.

Bedsize for the hospitals is on the Medicare Cost report file, however the rehabilitation units within general hospitals have only unit size on their cost reports. In order to obtain a bedsize for the entire general hospital that the unit is located in, the best possible values were taken from the HCFA FY1987 Impact File, the Provider of Service File and the AHA Surveys.

Outlier Trims

A final step in the data preparation before beginning the preliminary analysis was to trim the data for large outliers and possible data errors. This was a particularly important step because of the possible inaccuracies found in unaudited cost reports (audited cost reports were not available for some providers).

We first dropped all observations where either the number of Medicare discharges was zero or there was no value for the target amount. Providers with missing target amounts are probably either new hospitals or units or facilities that have been recently converted to either rehabilitation, childrens or long-term care. For either of these two situations, the facility would be reimbursed the lesser of costs or charges for their first fiscal year and the second full 12-month fiscal year would be considered the base year for TEFRA payment.

We then, for each facility type, examined the distribution across providers of average cost per day, average length-of-stay, target amount per discharge and the difference between average cost and target amount as a percentage of the total target amount. Observations with values in the bottom and top one percent for these variables were set aside for closer examination. For many of these records it was obvious at first inspection that the data were inaccurate. For example, some records had negative average cost or target amounts, identical values for two consecutive years, or a value for one unaudited cost report year that was vastly different in value from a previous audited year. These records with obvious errors were dropped and the remaining "outliers" were examined more closely with the assistance of HCFA's payment determination policy branch.

The result of these trims was that for rehabilitation facilities 11 observations were dropped from the 1986 file and nine from the 1987 data, leaving sample sizes of 353 and 422, respectively. For long-term care hospitals, six observations were dropped from the 1986 file and four from the 1987 data, leaving sample sizes of 53 and 50, respectively. No children's hospitals were dropped. There are 28 hospitals present in 1986 and 29 in 1987. As just mentioned, long-term care and children's hospitals have small sample sizes. Therefore most of the descriptive analyses in this report will focus on the rehabilitation facilities, whose sample size allows us to examine statistics across different stratifiers.

Exception Policy

A facility can submit an exception application to its fiscal intermediary to appeal its target amounts if it is believed that there are factors that distort base year costs or rates of increase. An exception may be granted for one of the following reasons: a significant change in casemix in a given year compared to the base year; extraordinary circumstances beyond the control of the facility; or a distortion in either base year costs or length-of-stay as compared to the year in question. The exception request must document the cause for the request, as well as the cost effect of the cause. The fiscal intermediary then reviews the request and submits its

recommendations to HCFA where the final decision is made. All exceptions are done retrospectively, and are only granted for the particular year requested. Our data set does not allow us to determine if an exception has been either requested or accepted for a particular facility.

The exception policy is a concern for this TEFRA impact analysis. There is a considerable time lag between the fiscal year for which an exception is requested and the year in which that request is finally granted. HCFA is now reviewing exception requests for fiscal years as early as 1984 and 1985. Therefore, our data probably do not include any exception adjustments, and we may be over-estimating the ultimate loss in facilities making successful applications.

Sources at HCFA estimate that about 110 excluded facilities, which include rehabilitation, children's, long-term care, and psychiatric facilities, have requested an exception from HCFA since TEFRA was implemented. The majority of these were rehabilitation facilities. Although the number of existing psychiatric facilities far exceeds the number of rehabilitation facilities in the United States, it is thought that only 10 percent of the 110 were psychiatric facilities. About 90 percent of all facilities requesting an exception were granted a partial or total adjustment. The others were either given a flat denial or asked for further documentation. The average dollar amount of the exception is unknown.

3.0 THE IMPACT OF THE TEFRA PAYMENT SYSTEM ON PPS EXEMPT HOSPITALS AND EXCLUDED UNITS

3.1 Introduction

This chapter forms the main body of the report, an analysis of the impact of TEFRA on PPS-excluded facilities using data from Medicare Cost Reports for the fiscal years 1986 and 1987. Psychiatric facilities are only described briefly since a more detailed analysis of the impact of TEFRA on psychiatric facilities can be found in an earlier report written by CHER researchers (see Cromwell, Harrow and McGuire, 1989).

The chapter begins with a description of the financial incentives to facilities under the TEFRA payment system. The empirical analysis in this chapter examines the facility's TEFRA margins, the difference between the actual Medicare payment and the facility's average cost. This chapter also compares the actual Medicare payment with the target amount. Since the target amount is a facility's average cost trended forward by update factors, it serves as a standard of comparison for Medicare payments and actual facility average costs. A facility's financial success under TEFRA depends upon how well they can keep their own cost inflation at or below the update factors.

3.2 Incentives Under TEFRA

Incentives under TEFRA depend on the relationship of the facilities target amount and average cost per discharge. The target amount for the first year of TEFRA was equal to the operating costs of the previous year plus an inflation adjustment. The target amount per case for every year after that was originally intended to be based on the previous year's target amount per case plus an inflation adjustment reflecting the percentage increase in the hospital wage and price index, plus one percentage point. Instead, the adjustments were set to the same rate of increase as the update factor for PPS facilities, which fell below the (PPS market basket) rate.

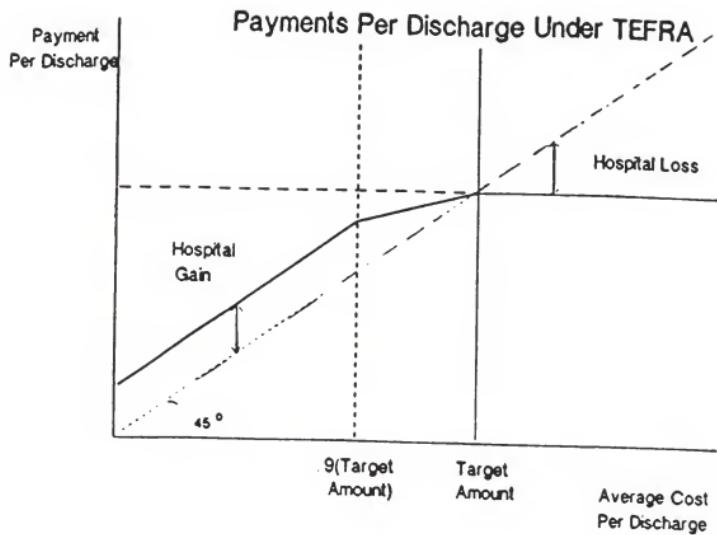
Figure 1 illustrates the relationship between average cost per discharge and payment per discharge under TEFRA. The figure is divided into three sections according to how the average cost compares with the target amount. When average cost per discharge is equal to the target amount, payment per discharge is maximized and the facility neither loses nor gains. For average costs per discharge that are to the right of this point the facility experiences a loss equal to 100 percent of the difference between the average cost and target amount.

If the facility's average cost per discharge is less than the target amount per discharge the facility receives in payment the average cost plus an incentive payment. The incentive payment is at a maximum where average cost is 90 percent of the target amount, since half the difference between target amount and average cost is equivalent to 5 percent of the target amount at this point.

For any average cost per discharge amount that is less than 90 percent of the target amount per discharge, the payment per discharge for the facility is simply average cost plus 5 percent of the target amount per discharge.

The financial incentives for a facility under TEFRA depend upon where the hospital believes it will be at the end of the fiscal year on this graph. If a facility accurately forecasts that its average costs at the end of a year will exceed its target amount, the facility, in effect, bears the full marginal costs associated with each discharge. For each dollar saved on a discharge (if the facility is in this range), a dollar of losses is saved at the end of the year. Facilities that believe they will end the year in this region thus operate under incentives similar to PPS. For a facility accurately forecasting that it will end up with an average cost between 90 percent of the target amount and the full target amount, the facility shares financial risk with Medicare 50 percent - 50 percent. A one dollar increase in average cost decreases facility net revenue by \$.50. A facility knowing it will collect the maximum incentive payment has incentives similar to cost-based reimbursement. Extra spending on a discharge increases expected revenues dollar-by-dollar.

Figure 1



The incentives set up by the TEFRA payment system differ in a number of important ways from those in PPS. First, the marginal incentives for reducing levels of care are less in TEFRA than in PPS. Until the outlier threshold is reached in PPS, the facility bears all costs at the margin. Because outlier payments have made up such a small portion of total PPS payments, the weakened incentives associated with the portion of some stays that cross outlier thresholds have probably had a small effect on the overall strength of the incentives in PPS. As we saw above, only when the average costs at a facility exceed the target amount are the incentives as strong as in PPS.

Second, marginal incentives in PPS are known at the time treatment is being provided. In TEFRA, there is some uncertainty about how the financial situation of the facility will be affected by additional spending on a case. Incentives in TEFRA depend on their relationship between a target amount and average cost, which is not determined until the close of the fiscal year. In PPS, the facility knows precisely the degree of marginal cost-sharing it is incurring on a case, and the gains and losses associated with various levels of treatment. Up to the outlier threshold, the facility bears 100 percent of the marginal costs of care. Beyond the known threshold, the facility bears a portion of marginal costs. The DRG payment is known in advance. The facility paid under TEFRA may have some idea about the range in which average costs will fall, but there will also, in general, be some uncertainty about this, particularly early in the fiscal year.

Third, TEFRA is more asymmetric than PPS in its treatment of gains and losses. In relation to the DRG payment, PPS allows the facility to keep all of the gains from reduced costs. PPS requires the facility to bear almost all of the losses for costs above the DRG payment, modified only by the per case outlier provisions. TEFRA, by contrast, has no risk sharing by Medicare on the loss side, but extensive risk-sharing on the gain side. Facilities face the risk of gaining little but losing much in TEFRA. In PPS, gains or losses could each be large.

Finally, TEFRA allows for an exception process, discussed above, which on an administrative basis, can raise a facility's payment to reduce losses.

The exception process appears to be active, but occurs with a relatively long lag, and does not recognize as a basis for appeal all reasons for increased costs at facilities. Unusually long length of stay is a legitimate basis for an appeal, however, so the exception process must play a role in protecting facilities against some losses, and weakening incentives to limit care.

The effect of these differences is the incentives to limit care are unequivocally less in TEFRA than the incentives in PPS.

3.3 Method for Assessing a TEFRA Impact

The empirical evaluation of the impact of TEFRA beginning in the next section provides some evidence about how facilities have responded to TEFRA's financial incentives and to the consequences of the TEFRA system for facilities and Medicare. For purposes of investigating the TEFRA impact, we define the following variables:

```
TARGET = target amount per discharge for the facility;  
AVGCOST = total program inpatient operating costs/program  
           discharges;  
INCENT = .05 * [TARGET - AVG COST], if TARGET > AVG COST,  
           subject to INCENT ≤ .05 * TARGET  
PAYMENT = the lesser of AVG COST + INCENT, or TARGET  
TOTGAIN = TARGET - AVG COST = HOSPGAIN + GOVGAIN;  
HOSPGAIN = PAYMENT - AVG COST;  
GOVGAIN = TARGET - PAYMENT.
```

The first three variables have been explained in Section 3.2. PAYMENT is the total amount that the hospital receives per Medicare discharge, the lesser of the average cost per discharge plus the incentive payment and the target amount per discharge.

The variable TOTGAIN is defined to be the difference between the target amount and average cost. In 1982, the base year, the target amount is equal to average cost and TOTGAIN is equal to zero for each hospital. For every

year after 1982, TOTGAIN can either be negative or positive depending upon how average cost increases relate to the update factor. A positive TOTGAIN indicates that a hospital's costs have risen slower than the update factor. A negative TOTGAIN indicates that costs are increasing at a rate that is higher than the update factor. When TOTGAIN is equal to zero, there is budget neutrality at the hospital level, average cost equals the target amount, and Medicare pays each hospital the same amount as that hospital would get under cost-based reimbursement.

The difference between target amount and average cost can be divided into two parts; HOSPGAIN and GOVGAIN. The difference between Medicare TEFRA payment and average cost is HOSPGAIN. This is the hospital's TEFRA margin and is equivalent to PPS profits. GOVGAIN is the difference between the target amount and TEFRA payment and represents Medicare's share of any profits. This amount is always either zero or positive because, under TEFRA's financial incentives, the facility bears all the losses when costs run beyond target amount, while the Medicare program shares in the profits when average costs are below the target amount. Under the type of financial incentives in place under PPS, there is no GOVGAIN and facilities keep the entire difference between average cost and the DRG rate. HOSPGAIN (TEFRA margin) and GOVGAIN sum to TOTGAIN, the total difference between average cost and target amount.

3.4 Overall Results

This section assesses the impact of TEFRA on excluded facilities by examining important payment variables. The focus is on rehabilitation, long-term care and children's facilities. Rehabilitation facilities will be described in more detail than the other facilities because the larger sample size allows us to examine the TEFRA impact on these facilities across different descriptive characteristics.

All average values presented in this section have been weighted by the number of Medicare discharges. Therefore, a facility with a high average gain or loss per case from TEFRA that has very few Medicare patients will not be

given as much weight as a facility with a large number of Medicare patients. Table 3-1 summarizes the results for all excluded facilities for fiscal years 1986 and 1987.

Since all available, edited, data are used for each year, the number of reporting facilities differs by year. Table 3-1A shows the same results for a cohort of facilities present in both years.

The first two columns of Table 3-1 present the results for rehabilitation facilities, which include both hospitals and distinct part rehabilitation units in general hospitals. The average cost per case in these facilities was \$8,200 in 1986, slightly less than the average target amount per case of \$8,330. The difference of \$130 is the average total gain per case, indicating that average costs had risen more slowly through 1986 than the update factor.

As mentioned earlier, the total gain per case is the sum of two components. The first component is the hospital gain or TEFRA margin, the difference between average cost and the hospital's payment from Medicare. Hospital gain per case (HOSPGAIN) is equivalent to PPS profits, it measures hospital financial performance under TEFRA. The second component is the gain received by Medicare, the difference between the payment amount and the target amount. Although in 1986 rehabilitation facilities show a positive total gain per case, on average the facilities lost \$282 per case and the Medicare program gained \$412. This occurs because of the asymmetric relation between average payments and average costs in TEFRA, depicted in Figure 1. Overall, average costs and target amounts are about equal. However, at the facility level, target amount and average cost often differ substantially, which benefits the Medicare program. When average cost exceeds the target amount, Medicare bears none of the risk of this excess. When average cost falls below the target amount Medicare appropriates at least half of the gain (and all of it beyond five percent of costs).

In 1987, rehabilitation facilities no longer show a positive total gain per case. Average cost has increased significantly ($p < .05$) by \$485 per case to \$8,685 (a 5.9 percent increase) while the target amount increased half as

TABLE 3-1

AVERAGE VALUES FOR MEASURES OF TEFRA IMPACT FOR EXCLUDED FACILITIES, 1986-1987

	REHABILITATION			LONG TERM CARE			CHILDREN			PSYCHIATRIC		
	1986	1987	%Δ	1986	1987	%Δ	1986	1987	%Δ	1986	1987	%Δ
Mean:	(n=353)	(n=422)		(n=53)	(n=50)		(n=28)	(n=29)		(n=897)	(n=978)	
Average Cost Per Case	\$8,200	\$8,685	5.9%	\$8,210	\$8,635	5.2%	\$6,909	\$7,338	6.2%	\$4,358	\$4,945	13.5%
Target Amount Per Case	8,330	8,553	2.7	8,519	8,476	-0.5	7,526	7,615	1.2	4,359	4,503	3.3
Medicare Payment Per Case	7,918	8,132	2.7	7,873	8,085	2.7	6,480	6,668	2.9	4,096	4,366	6.6
Total Gain Per Case	130	-131	-201	309	-159	-151	617	277	-55.1	0	-442	--
Hospital Gain Per Case	-282	-552	-95.7	-337	-550	-63.2	-429	-670	-56.2	-262	-579	-121
Medicare Gain Per Case	412	421	2.2	646	391	-39.4	1,046	947	-9.5	262	137	-47.7
Medicare Dependency	66.9%	67.6%	1.0	47.1%	50.8%	7.9	1.6%	1.8%	12.5	26.8%	26.7%	-0.4
Length of Stay	23.6	23.5	-0.4	25.8	26.4	2.3	7.3	6.9	-5.4	19.0	16.0	-15.8

Note: Statistics shown are weighted averages based on the number of Medicare discharges.

Sources: Columns 1-9: 1985-1987 PPS Exempt Hospitals and Excluded Units File.

Columns 10-12: Cromwell, Jerry, Brooke Harrow, and Thomas McGuire, TEFRA Psychiatric Hospital and Unit Peer Group and Case Outlier Analyses, Task 3: Final Report, submitted to ASPE, DHHS under Contract No. HHS 100-88-0037, November 30, 1989.

TABLE 3-1A

AVERAGE VALUES FOR MEASURES OF TEFRA IMPACT FOR A COHORT OF EXCLUDED FACILITIES, 1986-1987

	REHABILITATION			LONG TERM CARE			CHILDREN			PSYCHIATRIC		
	1986	1987	%Δ	1986	1987	%Δ	1986	1987	%Δ	1986	1987	%Δ
Mean:	(n=315)			(n=43)			(n=25)			(n=767)		
Average Cost Per Case	\$8,275	\$8,669	4.8%	\$8,387	\$8,804	5.0%	\$6,929	\$7,690	11.0%	\$4,538	\$4,816	6.1%
Target Amount Per Case	8,452	8,562	1.3	8,516	8,578	0.7	7,563	8,076	6.8	4,430	4,491	1.4
Medicare Payment Per Case	8,021	8,147	1.6	8,000	8,180	2.3	6,518	7,052	8.2	4,149	4,224	1.8
Total Gain Per Case	177	-106	-160	128	-226	-276	633	386	-39.0	-108	-326	-202
Hospital Gain Per Case	-254	-521	-105	-387	-624	-61.2	-412	-638	-54.9	-389	-593	-52.4
Medicare Gain Per Case	431	415	-3.7	515	397	-22.9	1,045	1,024	-2.0	282	267	-5.3
Medicare Dependency	66.8%	67.0%	0.3	47.3%	48.1%	1.7	1.6%	1.6%	0.0	23.8%	24.3%	2.1
Length of Stay	23.6	23.3	-1.3	26.1	26.9	3.1	7.3	7.0	-4.1	19.3	18.9	-2.1

Note: Statistics shown are weighted averages based on the number of Medicare discharges.

Sources: Columns 1-9: 1985-1987 PPS Exempt Hospitals and Excluded Units File.

Columns 10-12: Cromwell, Jerry, Brooke Harrow, and Thomas McGuire, TEFRA Psychiatric Hospital and Unit Peer Group and Case Outlier Analyses, Task 3: Final Report, submitted to ASPE, DHHS under Contract No. HHS 100-88-0037, November 30, 1989.

much, going from \$8,330 in 1986 to \$8,553 in 1987 (a 2.7 percent, insignificant increase), an amount \$131 less than the average cost per case for that year. These differences between the two years are not merely because of sample size differences. As shown in Table 3-1A, for a cohort of facilities, average cost increased 4.8 percent ($p < .10$) while the target amount grew by 1.3 percent.

Referring again to Table 3-1, Medicare gain per case has stayed about the same, while facilities have nearly doubled their average loss per case, from \$282 to \$552 ($p < .01$). Medicare gain per case is determined by both the percentage of all facilities with a positive TEFRA margin and the average value of this margin for those facilities. As can be seen later on in Section 3.9, the percentage of rehabilitation facilities with positive TEFRA margins declines slightly from 46 percent in 1986 to 41 percent in 1987. Therefore, in order for GOVGAIN to have remained constant in this period, the average TEFRA margin for those receiving a positive TEFRA margin must have increased between the two years.

Medicare dependency for the excluded facilities is also shown on Table 3-1. Medicare dependency is defined here as the percentage of total discharges that are Medicare patients. This number is important for assessing the impact of TEFRA losses on a facility. Facilities with a low percentage of Medicare patients are less affected by gains or losses under TEFRA and may not respond as strongly to TEFRA's financial incentives as a facility with a high proportion of Medicare patients.

Rehabilitation facilities are heavily dependent on Medicare patients. In 1986, 66.9 percent of their patients were reimbursed under the Medicare program. In 1987 this increased slightly to 67.6 percent. For the cohort of facilities, shown in Table 3-1A this increase is negligible (.3 percent). A Medicare dependency ratio of about 67 percent means that for two-thirds of their patients rehabilitation facilities had an expected loss of \$282 in 1986 and \$552 in 1987 (Table 3-1).

Average length of stay is shown in the last row of Table 3-1. Length of stay for these facilities is examined for two reasons. First, to determine if

longer stays can help explain the increase in costs. Second, if the lengths of stay are increasing, this could indicate that the severity of patients treated in excluded facilities is increasing. However, as seen in Table 3-1, the average length of stay for Medicare patients in rehabilitation facilities has stayed at 23.5 days for both 1986 and 1987. If patients are sicker, this may cause a rise in costs per day but apparently not in the length of stay.

The next two columns in Table 3-1 present results for long-term care hospitals. In 1986, these facilities also had a target amount that exceeded average cost and a total gain per case of \$309. Facilities, however, lost an average of \$337 per discharge while Medicare "saved" an average of \$646 under TEFRA.

In 1987, average cost per case for long-term care hospitals increased about 5 percent to \$8,635. Table 3-1 actually shows a slight decrease in the target amount between the two years. This is entirely due to the difference in sample sizes between the two years. In Table 3-1A, for the 43 long-term hospitals present in both years, average cost per case increased 5 percent, and the average target amount per case increased less than one percent. For long-term care hospitals, there are no significant differences between 1986 and 1987 for any of the TEFRA impact variables, due to the small sample size. For example, the 90 percent confidence interval for average cost in 1986 (based on the cohort data) is from \$7,172 to \$9,603. In other words, the average costs for these long term care hospitals would have to increase by at least 15.5 percent (from \$8,387 to over \$9,603) in order to be considered a significant difference at the 90 percent level.

Nearly half of all patients in long-term care hospitals are reimbursed under Medicare. That is, for half of all long-term care hospital admissions, the expected loss was about \$600 (HOSPGAIN). Length of stay for Medicare discharges from long-term care hospitals stayed at about 26 days for both years.

Columns 7, 8, and 9 show the results for the children hospitals. The average cost per case for Medicare patients is \$6,909 in 1986. The target amount is \$617 higher, indicating that costs rose more slowly than the update factor -- at least through 1986. Medicare's gain per case is \$1,046 in 1986,

the largest per case savings of all the excluded facilities. While Medicare saved, however, children's hospitals themselves still experienced a loss of \$429 per case. In 1987, the difference between average cost and target amounts per case narrows as costs rise more quickly than the target amount. Medicare's gain drops slightly to \$947 per case, and the facilities' average loss per case rises to \$670, (both are statistically insignificant changes).

In Table 3-1A, for the 25 children's hospitals present in both years of data the results are nearly the same as those shown in Table 3-1. All changes between the two years are insignificant at the 90 percent level due to the small sample size.

As might be expected, less than 2 percent of the discharges from these facilities were Medicare patients. Therefore, children's facilities are hardly affected by their gains or losses under TEFRA. In 1987, children's hospitals could expect to lose \$670 on only one out of every 56 patients. The average length of stay for children's hospitals is short, only about one week, less than a third of the stay in rehabilitation and long-term care facilities.

The last three columns present the results for psychiatric facilities which include both psychiatric hospitals and distinct part psychiatric units. As mentioned earlier, results for the psychiatric facilities are only summarized here. The impact of TEFRA on psychiatric facilities has been described in great detail in previous research performed by some of the authors of this report (See Cromwell, Harrow and McGuire, 1989).

In 1986, for psychiatric facilities the average cost per case is essentially identical to the target amount, and there is zero total gain. Medicare does gain \$262 per case, a figure coincidentally identical to the average facility loss. The target amount is below average cost in 1987, resulting in a total social gain of -\$442. Medicare still achieves some cost savings, \$137 per case. In 1987, psychiatric facilities are losing an average of \$579 per case.

Medicare patients are not as important to psychiatric facilities as they are to rehabilitation and long-term care facilities, but they still account for nearly 27 percent of all discharges in both years. Looking across all the

excluded facilities in Table 3-1, there is a continuum of Medicare dependency. Children's hospitals are at one end of the continuum, with less than two percent of their patients reimbursed under Medicare. Long-term care hospitals are dependent on Medicare for half of their patients. Rehabilitation facilities are most likely to respond to TEFRA's financial incentives. Two-thirds of rehabilitation facilities' patients are reimbursed under Medicare.

3.5 TEFRA Impacts in Rehabilitation Facilities

Rehabilitation facilities will be examined more closely than the other excluded facilities for two reasons. First, as mentioned above, two-thirds of all patients in rehabilitation facilities are reimbursed under TEFRA. Second, the large sample size for rehabilitation facilities allows us to compare the impact of TEFRA across different characteristics in order to see if certain types of facilities are more likely to do better or worse under TEFRA.

The next four tables presents TEFRA payment and impact variables for rehabilitation facilities across facility characteristics for 1986 and 1987. Tables 3-2 and 3-3 show average costs, payment amounts and length of stay for these time periods. Tables 3-4 and 3-5 present statistics that assess the impact of TEFRA on rehabilitation facilities for these time periods. In 1986, rural rehabilitation facilities had costs that were 20 percent less and target amounts that were 27 percent less than their urban counterparts. These differences are statistically significant ($p < .01$), even though there are only 24 rural rehabilitation facilities in our sample, just 7 percent of the total. The average Medicare payment per discharge for rural facilities is also significantly ($p < .01$) lower than that for facilities located in urban areas, \$5,970 as compared to \$8,014 per case.

The fifth column presents the average incentive payment per discharge. This is the additional payment above average cost that a facility receives if average cost is below the target amount. The incentive payment can only be zero or positive. Table 3-2 presents the average incentive payment per

TABLE 3-2

AVERAGE COSTS, LENGTH OF STAY, AND PAYMENT AMOUNTS PER DISCHARGE BY FACILITY CHARACTERISTICS,
REHABILITATION FACILITIES, 1986

		Average Target Amount Per Discharge	Average Cost Per Discharge	Average Medicare Payment Per Discharge	Average Incentive Payment Per Discharge	Average Length of Stay
Overall	353	\$8,330	\$8,200	\$7,918	\$188	23.6
Rural	24	6,148	6,543	5,970	78	21.0
Urban	329	8,437	8,281	8,014	194	23.7
Region						
New England	16	8,535	8,482	8,236	212	26.8
Middle Atlantic	49	7,848	7,457	7,371	183	24.8
South Atlantic	29	7,290	7,136	6,737	194	24.4
East N. Central	72	9,495	9,054	8,945	258	24.6
East S. Central	7	7,006	6,844	6,778	220	23.6
West S. Central	40	6,775	6,779	6,453	147	21.4
West S. Central	31	6,670	6,774	6,392	115	22.4
Mountain	30	7,322	7,821	7,147	68	20.9
Pacific	79	10,966	11,137	10,570	211	22.7
Facility Type						
Hospital	59	8,323	7,749	7,767	244	24.8
Unit	294	8,334	8,463	8,006	155	22.9
Bedsize						
0-49 beds	13	8,288	8,254	7,865	183	23.1
50-99	36	7,525	7,190	7,034	177	23.7
100-199	47	9,578	8,933	9,062	291	25.1
200-299	55	8,816	8,327	8,297	197	23.9
300-399	69	7,900	8,105	7,611	158	21.6
400-499	45	8,093	8,457	7,719	149	22.2
500-699	52	8,056	8,556	7,798	109	24.1
700+	36	8,435	8,285	8,090	204	24.3

Note: Statistics shown are weighted averages based on the number of Medicare discharges.

Source: 1985-1987 PPS Exempt Hospitals and Excluded Units file.

TABLE 3-3

AVERAGE COSTS, LENGTH OF STAY, AND PAYMENT AMOUNTS PER DISCHARGE BY FACILITY CHARACTERISTICS,
REHABILITATION FACILITIES 1987

		Average Target Amount Per Discharge	Average Cost Per Discharge	Average Medicare Payment Per Discharge	Average Incentive Payment Per Discharge	Average Length of Stay
Overall	422	\$8,554	\$8,685	\$8,132	\$176	23.5
Rural	33	6,869	7,455	6,656	90	21.3
Urban	389	8,643	8,750	8,211	180	23.7
Region						
New England	24	9,180	9,180	8,642	212	26.6
Middle Atlantic	60	8,144	7,981	7,740	177	25.3
South Atlantic	38	7,716	8,051	7,253	176	24.2
East N. Central	92	9,562	9,315	8,976	255	23.8
East S. Central	11	7,570	7,550	7,469	84	23.1
West S. Central	45	7,291	7,545	6,902	113	22.0
West S. Central	32	6,629	7,606	6,455	66	22.8
Mountain	37	7,787	8,170	7,453	121	19.7
Pacific	83	10,818	11,196	10,343	213	22.2
Facility Type						
Hospital	58	8,618	8,244	8,106	218	24.8
Unit	364	8,522	8,896	8,145	155	22.9
Bedsize						
0-49 beds	13	8,246	8,351	7,930	105	21.8
50-99	36	7,925	7,823	7,517	176	24.1
100-199	54	9,624	9,282	9,091	254	24.5
200-299	64	8,898	8,774	8,357	188	24.0
300-399	86	8,403	8,634	7,967	170	21.6
400-499	57	8,018	8,500	7,659	119	21.9
500-699	68	8,206	8,799	7,941	135	24.1
700+	43	8,790	9,211	8,384	181	24.7

Note: Statistics shown are weighted averages based on the number of Medicare discharges.

Source: 1985-1987 PPS Exempt Hospitals and Excluded Units file.

TABLE 3-4

TEFRA IMPACT BY FACILITY CHARACTERISTICS, REHABILITATION FACILITIES, 1986

	<u>N</u>	Difference Between Target And Average Cost (TOTGAIN)	Difference Between Payment And Average Cost (HOSPGAIN)	Difference Between Target And Payment (GOVGAIN)	Percentage of Total Discharges That Are Medicare (MEDPER)
<u>Overall</u>	353	\$130	\$-282	\$412	66.9%
Rural	24	-395	-573	178	72.7
Urban	329	156	-267	423	66.6
<u>Region</u>					
New England	16	53	-246	299	57.3
Middle Atlantic	49	391	-86	477	71.2
South Atlantic	29	154	-399	53	63.5
East N. Central	72	442	-108	550	65.1
East S. Central	7	162	-669	228	65.5
West N. Central	40	-4	-326	322	68.1
West S. Central	31	-104	-382	278	67.0
Mountain	30	-499	-674	175	65.3
Pacific	79	-171	-568	397	66.6
<u>Facility Type</u>					
Hospital	59	573	18	557	64.1
Unit	294	-129	-457	327	68.6
<u>Bedsize</u>					
0-49 beds	13	34	-389	423	69.6
50-99	36	335	-156	491	68.3
100-199	47	645	129	516	62.2
200-299	55	489	-30	520	68.9
300-399	69	-205	-494	290	67.3
400-499	45	-364	-738	374	69.0
500-699	52	-500	-757	258	67.7
700+	36	150	-195	345	65.7

Note: Statistics shown are weighted averages based on the number of Medicare discharges.

Source: 1985-1987 PPS Exempt Hospitals and Excluded Units file.

TABLE 3-5

TEFRA IMPACT BY FACILITY CHARACTERISTICS, REHABILITATION FACILITIES, 1987

	<u>N</u>	Difference Between Target And Average Cost (TOTGAIN)	Difference Between Payment And Average Cost (HOSPGAIN)	Difference Between Target And Payment (GOVGAIN)	Percentage of Total Discharges That Are Medicare (MEDPER)
Overall	422	\$-131	-552	421	67.6%
Rural	33	-585	-799	213	69.3
Urban	389	-107	-539	432	67.5
Region					
New England	24	0	-537	537	59.5%
Middle Atlantic	60	163	-241	404	69.7
South Atlantic	38	-335	-798	463	64.7
East N. Central	92	247	-339	586	66.3
East S. Central	11	20	-81	101	74.2
West N. Central	45	-254	-643	389	69.9
West S. Central	32	-977	-1150	174	68.4
Mountain	37	-383	-717	334	73.3
Pacific	83	-378	-853	475	63.4
Facility Type					
Hospital	58	374	-138	512	65.3
Unit	364	-374	-752	377	68.7
Bedsizes					
0-49 beds	13	-105	-421	316	69.0
50-99	36	101	-306	408	68.1
100-199	54	341	-191	533	65.6
200-299	64	125	-416	541	68.6
300-399	86	-231	-667	436	70.5
400-499	57	-482	-840	359	70.0
500-699	68	-593	-858	265	65.9
700+	43	-421	-827	406	66.6

Note: Statistics shown are weighted averages based on the number of Medicare discharges.

Source: 1985-1987 PPS Exempt Hospitals and Excluded Units file.

discharge for all facilities, not just for those facilities which received a positive incentive payment. The average incentive payment for urban rehabilitation facilities is nearly two and a half times the amount for the rural facilities (\$194 versus \$78). Average length of stay is presented in the last column of Table 3-2. Urban rehabilitation patients experienced significantly ($p < .05$) higher lengths of stay, 23.7 days versus 21 days for rural facilities.

There is regional variation in costs and payment amounts as well. The Pacific region had the most rehabilitation facilities and the highest costs and payment amounts. The 1986 average cost per discharge was \$11,137 in the Pacific region with an average length of stay of 22.7 days. In New England the average length of stay was four days longer yet the average cost is just \$8,482, a figure that is nearly 24 percent less (statistically significant, $p < .01$) than that for Pacific facilities.

Looking across facility type, rehabilitation hospitals had an average target amount that was identical to that for rehabilitation units. Average costs, are nine percent greater for rehabilitation units than they are for the hospitals (\$8,463 versus \$7,749), yet this difference is not statistically significant at the 90 percent level. Average Medicare payments are slightly greater for units than hospitals. However, the average incentive payment is almost 37 percent higher for rehabilitation hospitals. This probably is reflecting the fact that more rehabilitation hospitals than units have maintained costs below the target amount and therefore received an incentive payment. There appears to be no discernable pattern across hospital bedsize, although there is a wide range of values for these payment variables. For example, the average target amount ranges from \$7,525 for the 50-99 bed group to \$9,578 for the next bedsize (100-199 beds) (statistically significant at $p < .05$.) The 50-99 bedsize group has the lowest average cost. These facilities are significantly less costly ($p < .10$) than any other bedsize group.

Table 3-3 presents the same statistics for 1987. There are 70 more rehabilitation units in the 1987 file, the majority of them are urban. The

East North Central region in 1987 has the most rehabilitation facilities, 92 units or hospitals. The Pacific region is still the most costly, although costs on average have remained about the same amount between the two years. In 1987, the average cost per discharge increased about 6 percent for hospitals, and 5 percent for units. Only the increase for the unit was statistically significant. Average target amount increased 3.5 percent for hospitals, 2.3 percent for units. Looking across bedsize categories, average cost and target amount have not changed significantly between the two years.

Table 3-4 presents statistics that assess the impact of TEFRA on rehabilitation facilities for 1986. Overall in 1986, TOTGAIN is positive for rehabilitation facilities, however, there is considerable variation across hospital characteristics. Rural facilities have a TOTGAIN of \$-395, while the average for urban facilities is significantly less ($p < .10$) at \$156. As Table 3-4 shows, across region, TOTGAIN is positive in the east and negative in the western regions. Rehabilitation hospitals, on average have a target amount that is greater than average cost, a positive TOTGAIN of \$573, while distinct-part rehabilitation units are significantly different ($p < .01$) with a TOTGAIN of -\$294. Across bedsize groups, the smaller bedsizes have a positive TOTGAIN, while with the exception of hospitals with over 700 beds, all hospital groups 300 beds or over have negative TOTGAIN amounts.

HOSPGAIN is a measure of the financial impact of TEFRA on the facilities and is equivalent to PPS profits. In 1986, on average, rehabilitation facilities lost \$282 per TEFRA discharge. There is considerable variation across facility characteristics. For rural facilities, the average loss per case under TEFRA was \$573, a figure which is 9 percent of their average cost in that year. Urban rehabilitation facilities, however, experienced a significantly ($p < .10$) smaller loss of \$267 per case, just 3 percent of their average cost in 1986.

Across region, the average facility loss per case ranges between \$86 for the Middle Atlantic region and \$674 for the Mountain region. Facilities in the East South Central region had an average loss per case that was nearly 10 percent of their average cost. Facilities in Middle Atlantic and East North

Central regions had small losses both in an absolute sense (\$86 and \$108 dollars respectively) and relative to their average cost. Facilities in these regions had losses just 1.2 percent of their average cost. Their losses were significantly ($p < .10$) smaller than those for any other region.

Rehabilitation hospitals experienced a slightly positive HOSPGAIN of \$18 per case, while units did significantly worse ($p < .01$), with a TEFRA margin of -\$457. Once again no pattern of HOSPGAIN exists across bedsize groups. Facilities with 100-199 beds are the only group to have a positive HOSPGAIN. Facilities in the 500-699 bedsize group fare the worst, with losses of \$738 and \$757, figures nearly 9 percent of their average costs.

The next column in Table 3-4 presents GOVGAIN, the measure of Medicare's savings under TEFRA. Medicare's share of the profits from urban facilities is over twice the amount per case (significant at $p < .05$) as rural (\$473 versus \$178). Across region, Medicare's "profit-sharing" is the most per case on facilities in the Middle Atlantic and East North Central regions. GOVGAIN is \$557 for rehabilitation hospitals, a figure that is over 7 percent of average cost per case. The difference between Medicare payment and target amount is \$327 per case for distinct part units, significantly smaller ($p < .10$) than that for hospitals, and, 4 percent of average cost. GOVGAIN is the greatest for hospitals between 100 and 300 beds. The average share of profits is about \$520.

The last column provides a measure of facility dependency on Medicare patients. This figure averages 67 percent and varies little across facility characteristics.

Table 3-5 shows the same statistics for 1987. Overall, TOTGAIN is now a negative \$131, on average, that is, the target amount per discharge is now below average cost. In 1987, the same pattern exists across facility characteristics as was present in 1986. With the exception of the South Atlantic region, the eastern regions have a positive TOTGAIN. Rehabilitation hospitals still have a positive TOTGAIN in 1987, while units do not.

In 1987, because average costs grew at a rate exceeding the target amount, average facility losses (HOSPGAIN) were higher for that year. Facilities in the West South Central did the worst, with an average loss of

\$1150, a figure twice as large as the overall average for rehabilitation facilities and three times as great as the year before. The larger hospitals also did poorly in 1987. Hospitals with 400 beds or greater have losses of over \$825 per case. Facilities in the 700+ bedsize group did particularly poorly in 1987 as compared to 1986. Their loss per case quadrupled from \$195 per case to \$827 (statistically significant at $p < .10$).

The Medicare program continues to enjoy TEFRA cost savings in 1987, at approximately the same amount per case as in 1986. Overall, Medicare dependency remained at about the same for all groups.

3.6 Distribution of Target Amount, Average Cost and HOSPGAIN

This section examines the distribution of the target amount per discharge, average cost and HOSPGAIN for rehabilitation facilities. We are once again, looking at just the rehabilitation facilities because of the small sample sizes for the other types of facilities. Appendix A provides the same figures for the childrens' and long-term care facilities.

Figures 2 and 3 show the distribution of target amounts for the years 1986 and 1987. These distributions are also shown in tabular form in Table 3-6, along with the distribution of average cost for the same years. In 1986, the mean target amount per discharge was \$8,330. About half of the facilities have target amounts in 1986 that fall between \$6,200 and \$10,600. (See Table 3-6). Ten percent of facilities have targets that are below \$5,000 and another ten percent of facilities have target amounts that are over \$13,000. In 1987, the distribution of target amount changes very little, as might be expected, since the update factor does not vary systematically. For both years, the distribution approximates a log normal shape. In 1987, the distribution shifts slightly to the right.

Figures 4 and 5 show the distribution of average costs at the same facilities for 1986 and 1987. (See also Table 3-6). Distributions are similar to the distribution of target amount but with a more normal rather than log normal shape.

TABLE 3-6

DISTRIBUTIONS OF TARGET AMOUNT AND AVERAGE COST FOR REHABILITATION FACILITIES,
1986 and 1987

	TARGET AMOUNT PER CASE		AVERAGE COST PER CASE	
	1986	1987	1986	1987
Mean	\$8,330	\$8,553	\$8,200	\$8,685
Minimum	2,339	2,243	2,275	2,520
Bottom 10%	4,891	5,126	5,400	5,767
Bottom 25%	6,273	6,505	6,791	7,236
Median	8,127	8,336	8,583	8,940
Top 25%	10,612	10,878	10,520	11,231
Top 10%	13,191	13,603	13,064	13,886
Maximum	38,00	39,080	37,759	31,668

Source: 1985-1987 PPS Exempt Hospitals and Excluded Units File.

Rehabilitation Facilities

Distribution of Target Amount, 1986

3-23 Number of Facilities

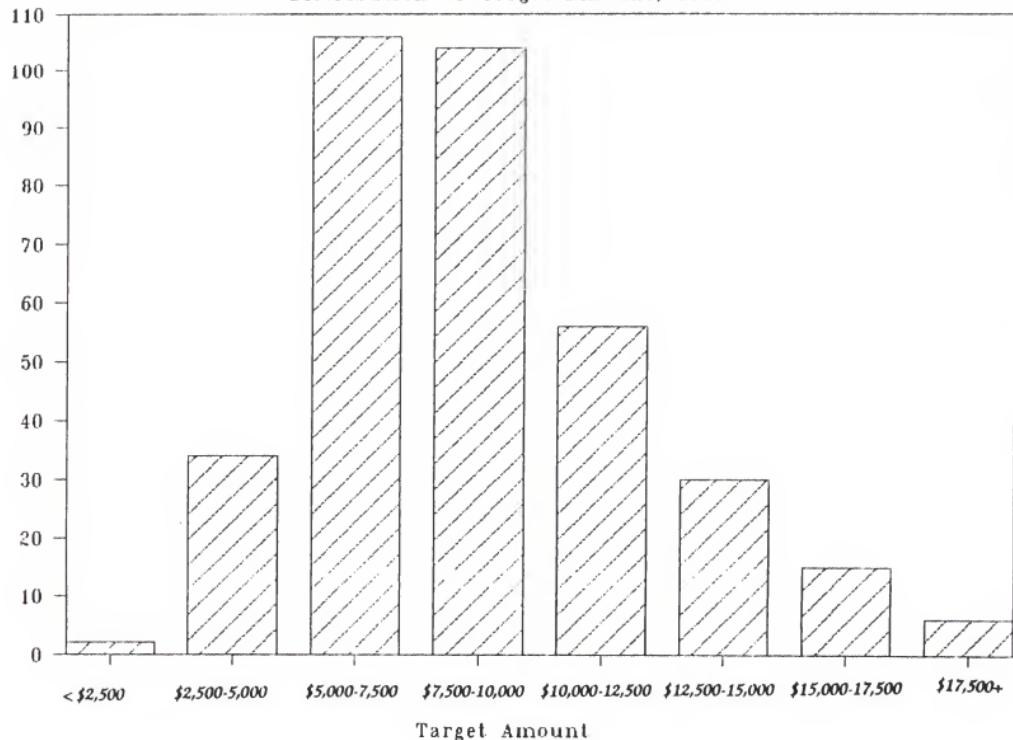


FIGURE 3

Rehabilitation Facilities

Distribution of Target Amount, 1987

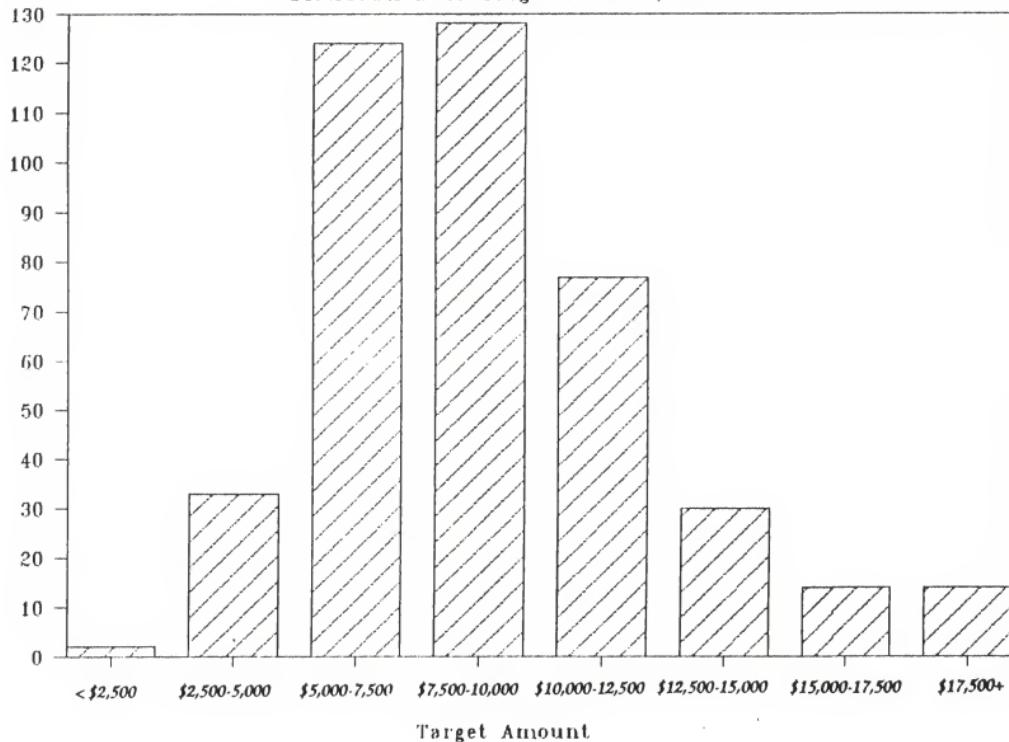


FIGURE 4

Rehabilitation Facilities
Distribution of Average Cost, 1986

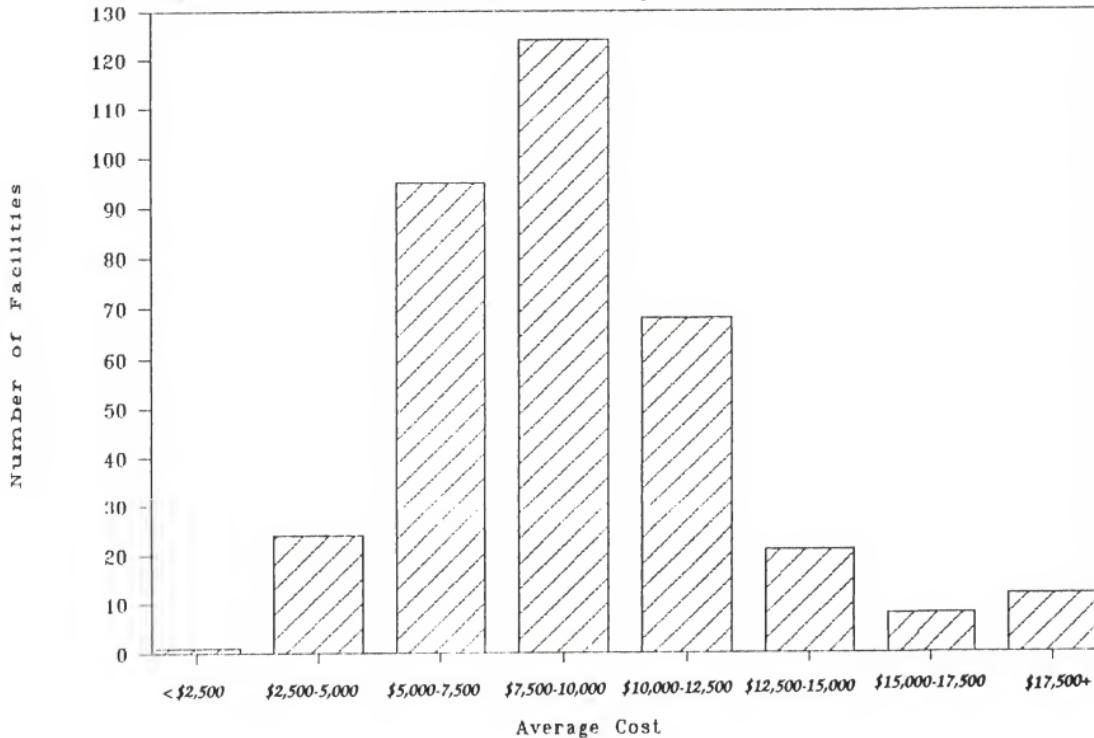
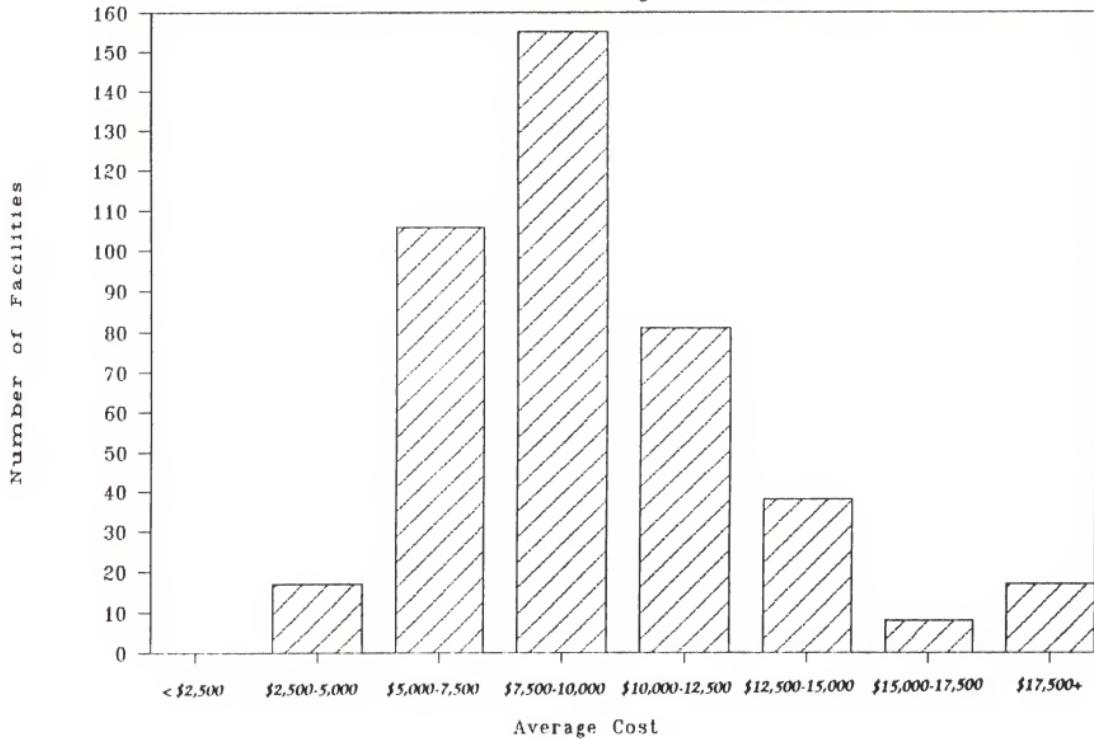


FIGURE 5
Rehabilitation Facilities
Distribution of Average Cost, 1987



The target amounts in 1986 and 1987 are equivalent to the average costs in 1982, increased by the update factors in the intervening years. Therefore a comparison of the distribution of target amounts of 1986 and 1987 with the distribution of average cost in 1986 and 1987 gives a more complete picture of how costs have been rising relative to the update factor. Average costs in 1986 and 1987 are more of a normal shape than target amounts, indicating that over time, the costs have been regressing to the mean. That is, higher cost hospitals have experienced smaller inflation rates than lower cost hospitals. The target amount of course, grows at the same rate across the distribution. This issue will be discussed more in Section 3.7.

Figures 6 and 7 and Table 3-7 present the distribution of hospital gain or TEFRA margin (Medicare payment per discharge less average cost per discharge) for 1986 and 1987. In 1986, the average TEFRA margin was \$-282. There is wide variation around this average. About 30 percent of all facilities enjoyed a positive TEFRA margin of over \$200 per case. Forty-five percent of facilities in 1986 lost over \$200 a case.

As can be seen in Figure 6 the distribution of TEFRA margins has a strong right skew. If the space allowed it, the left tail would be much longer. TEFRA margins decline at fairly constant rate after \$-3,600 up to a maximum loss of \$-15,732 per use.

Figure 7 shows the distribution of HOSPGAIN for 1987 which has much the same shape as Figure 6. There is a smaller percentage of hospital with small gains of up to \$400 and a greater percentage of losses that exceed \$3,600 per case.

3.7 Facility Characteristics, Winners and Losers

By definition, a facility with a positive TEFRA margin receives a Medicare payment that exceeds its average cost. In this section we attempt to take a look at factors associated with a win (positive HOSPGAIN) or loss (negative HOSPGAIN) at the facility level. We ask whether winning/losing is more associated with a high/low target amount, or with high/low average costs.

TABLE 3-7

DISTRIBUTIONS OF TEFRA MARGINS (PAYMENT LESS AVERAGE COST PER CASE) FOR REHABILITATION FACILITIES, 1986 and 1987

	<u>HOSPITAL GAIN PER CASE</u>	
	<u>1986</u>	<u>1987</u>
Mean	\$ -254	\$ -521
Minimum	-15,732	-13,745
Bottom 10%	-2,564	-3,048
Bottom 25%	-1,136	-1,767
Median	-35	-385
Top 25%	304	319
Top 10%	531	552
Maximum	1,065	1,954

Source: 1985-1987 PPS Exempt Hospitals and Excluded Units File.

FIGURE 6

Rehabilitation Facilities

Distribution of Hospital Gain, 1986

3-29

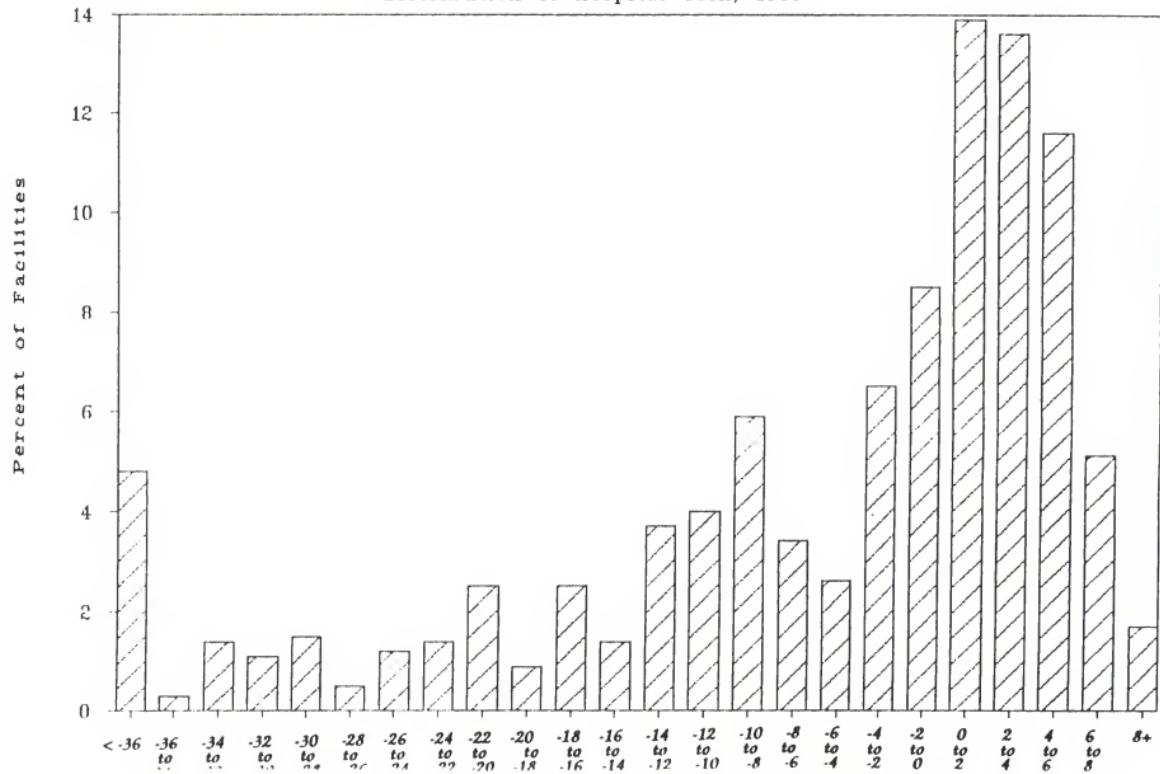
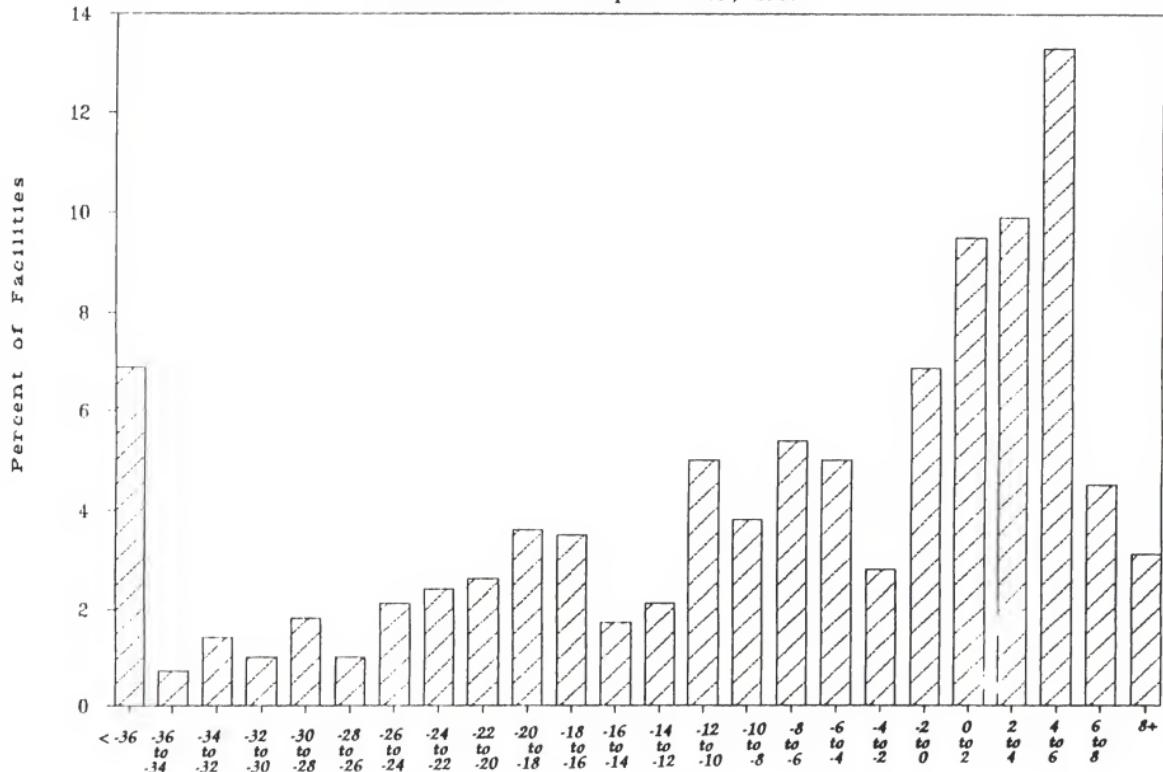


FIGURE 7

Rehabilitation Facilities

Distribution of Hospital Gain, 1987



For 1986 and 1987, each type of facility was divided into high and low target amount and average cost (according to the median). The percent winners for the high/low groups are reported in Table 3-8.

A high or low-target amount is a measure of the relative rankings of facility costs at the beginning of the TEFRA reimbursement program. In 1982, the base year, each target amount was set equal to average cost for that facility. Every year after 1982, hospitals received the same constant update factor. Therefore, a facility's target amount in 1986 is simply its average cost in 1982, updated by the update factor for the intervening years. A facility considered to be low-target in 1986 was a low-cost hospital in the base year, 1982, and similarly, a high-target hospital in 1986 was a high-cost hospital in base year, 1982.

If low- and high- target hospitals in 1986 (low and high-cost, 1982) are equally efficient, and there are no shifts in casemix during the period between 1982 and 1986, then both low-target and high-target hospitals in 1986 should be equally likely to have positive TEFRA margins.

As shown in Table 3-8, this is not the case. Across all facility types, high-target facilities in 1986 are more likely to have a positive TEFRA margin than low-target facilities. For example, for rehabilitation facilities, 58.2 percent of high-target hospitals are winners in 1986, but only 33.5 percent of low-target hospitals are winners. In other words, facilities with a high average cost in the base period were more likely to keep their cost inflation below the update factor than those facilities with a low average cost in 1982. This might mean that high-cost hospitals in 1982 improved their efficiency and/or, moved towards a simpler casemix, in the intervening years between 1982 and 1986.

Table 3-8 also shows that low-cost facilities in 1986 are more likely to have positive TEFRA margins than high-cost facilities. For example, for rehabilitation, 48.6 percent of low-cost facilities are winners in 1986 as compared to just 43.2 percent of the high-cost facilities. This group (low-cost 1986), has many low-cost facilities from the base year and some facilities which have a high-target in 1986 and therefore had a high-cost in

TABLE 3-8

PERCENTAGE OF FACILITIES WITH POSITIVE TEFRA MARGINS, 1986 and 1987

	PERCENTAGE WINNERS*			
	Rehabilitation	Long-Term Care	Children's	Psychiatric
1986				
Low Target	33.5%	46.2%	21.4%	39.5%
High Target	58.2	51.9	71.4	53.5
Low Cost	48.6	51.9	64.3	55.6
High Cost	43.2	46.2	28.6	37.4
Overall	45.9	49.1	46.4	46.5
1987				
Low Target	23.7	44.0	14.3	28.6
High Target	57.4	44.0	80.0	52.4
Low Cost	42.7	52.0	57.1	48.5
High Cost	38.4	36.0	40.0	32.5
Overall	40.5	44.0	48.3	40.5

*Winners are facilities with a positive TEFRA margin (HOSPGAIN).

Note: For rehabilitation facilities, median cost per discharge was \$8,583 for 1986 and \$8,937 for 1987. Median target amount per discharge was \$8,127 for 1986 and \$8,336 for 1987.

For long-term care hospitals, median cost per discharge was \$7,568 for 1986 and \$7,943 for 1987. Median target amount per discharge was \$7,137 for 1986 and \$6,596 for 1987.

For children's hospitals, median cost per discharge was \$6,350 for 1986 and \$7,607 for 1987. Median target amount per discharge was \$5,967 for 1986 and \$5,639 for 1987.

For psychiatric facilities, median cost per discharge was \$4,171 for 1986 and \$4,452 for 1987. Median target amount per discharge was \$4,036 for 1986 and \$4,195 for 1987.

Source: Columns 1-3: 1985-1987 PPS Exempt Hospitals and Excluded Units file.

Column 4: Cromwell, Jerry, Brooke Harrow, and Thomas McGuire, TEFRA Psychiatric Hospital and Unit Peer Group and Case Outlier Analyses, Task 3: Final Report, submitted to ASPE, DHHS under Contract No. HHS 100-88-0037, November 30, 1989.

the base year. Across the years, target amounts move at the same rate, and the gap between high and low-target amounts stays the same. However, the inflation rate in high-cost hospitals was less than that for so-called low-cost hospitals. The effect of this is to compress the average costs closer together. A few high-cost hospitals in the base period are now low-cost hospitals in 1986 and are more likely to have positive TEFRA margins, while a few low-cost hospitals in 1982 are now high-cost in 1986 and they are less likely to have positive margins, since they also have low target amounts.

In 1987, facilities with high target amounts are relatively more likely to have positive TEFRA gains than low-target facilities for all excluded facilities with the exception of long-term care hospitals. Across all facility types, low-cost facilities are more likely to win, although the difference is small for rehabilitation facilities.

In Section 3.5, we examined TEFRA's impact on rehabilitation facilities stratified by different characteristics. Here we examine whether certain characteristics are associated with a facility enjoying positive TEFRA margins.

Table 3-9 shows the percent winners (facilities with positive TEFRA margins) by facility characteristic for rehabilitation facilities for 1986 and 1987. Keep in mind that a facility need only have some positive HOSPGAIN to be a winner, a TEFRA margin of \$1 is a winner, a \$-1 is a loser. Overall, 46 percent of facilities were winners in 1986. This result varies across region and facility type. The West South Central and Mountain regions have relatively few winners (22.6 percent and 26.7 percent respectively). Fifty-nine percent of hospitals are winners, as compared to 43 percent of distinct-part units, a difference that is statistically significant ($p < .05$).

In 1987, the percentage of rehabilitation facilities with positive TEFRA margins declines to 40.5 percent. The West South Central continues to do poorly, with only 15.6 percent of facilities enjoying a positive TEFRA margin. The percentage of winners increases from 26.7 percent to 37.8 percent for the Mountain region and in New England the percentage declines from 56 to 29 percent. The differential between hospitals and units drops from 16 to 9 percentage points in 1987.

TABLE 3-9

PERCENTAGE OF FACILITIES WITH POSITIVE TEFRA MARGINS BY FACILITY CHARACTERISTICS, REHABILITATION FACILITIES, 1986 and 1987

	1986		1987	
	<u>N</u>	<u>Percent</u>	<u>N</u>	<u>Percent</u>
<u>Overall</u>	353	45.9%	422	40.5%
Rural	24	41.7	33	33.3
Urban	329	46.2	389	41.1
<u>Region</u>				
New England	16	56.3	24	29.2
Middle Atlantic	49	55.1	60	46.7
South Atlantic	29	44.8	38	42.1
East North Central	72	48.6	92	43.5
East South Central	7	71.4	11	54.5
West North Central	40	52.5	45	40.0
West South Central	31	22.6	32	15.6
Mountain	30	26.7	37	37.8
Pacific	79	46.8	83	44.6
<u>Facility Type</u>				
Rehabilitation Hospital	59	59.3	58	48.3
Rehabilitation Unit	294	43.2	364	39.3
<u>Bedsize</u>				
0-49 Beds	13	53.9	13	46.2
50-99	36	44.4	36	47.2
100-199	47	57.5	54	46.3
200-299	55	49.1	64	46.9
300-399	69	43.5	86	41.9
400-499	45	44.4	57	31.6
500-699	52	32.7	68	32.4
700+	36	50.0	43	39.5

Source: 1985-1987 PPS Exempt Hospitals and Excluded Units file.

In order to investigate whether some of the differences between the two years were due to changes in sample size, we examined the cohort of facilities present in both years (data not shown). For the most part, the trends shown in Table 3-9 were the same for this sub-sample. For example, 60 percent of facilities in New England had positive TEFRA margins in 1986 and this fell to 20 percent in 1987. The decline in the percentage of West North Central winners is less dramatic for the cohort facilities, declining from 24 percent in 1986 to 20 percent in 1987. One difference found when examining the cohort is that 42 percent of rural facilities had positive TEFRA margins in both years while urban facilities still declined from 46 to 40 percent. In 1987, therefore, rural facilities had a greater percentage of winners than their urban counterparts.

In order to better understand which characteristics are most associated with a facility enjoying positive TEFRA margins an analysis of variance was performed on the variable HOSPGAIN for rehabilitation facilities. Once again, this analysis was performed only on rehabilitation facilities because of the small sample sizes for the other facilities.

Table 3-10 reports these results for 1986. Urban/rural location, region, facility type (hospital or unit), and bedsize were used as potential explainors of hospital gain. The top half of the table provides the main effects, showing the contribution of each variable to the total sum of squares, controlling for the other variables. For example, a rehabilitation facility's urban/rural location only contributes 2.463 million of the 956.345 million total sum of squares. As seen by the low F value, urban location is not a significant explainor of TEFRA margin. Region, although it contributes nearly ten times the amount to the sum of squares as urban, is also not statistically significant, nor is FACTYPE. BEDS3 is the only categorical variable that was statistically significant. BEDS3 contributed 25,813 thousand to the total sum of squares of 956,345 thousand, therefore explaining 2.6 percent of total variance.

The bottom of Table 3-10 reports regression coefficient estimates that give additional information not found in the main effects. A categorical

TABLE 3-10

ANALYSIS OF VARIANCE AND REGRESSION COEFFICIENTS FOR EXPLAINING HOSPITAL GAIN
(PAYMENT LESS AVERAGE COST), REHABILITATION HOSPITALS AND UNITS, 1986

<u>Main Effects</u>	<u>Type III</u> <u>Sum of Squares</u>	<u>F Value</u>	<u>PR > F</u>
	<u>(Thousands)</u>		
URBAN	2,463.2	0.93	0.3361
REGION	22,546.2	1.06	0.3896
FACTYPE	95.4	0.04	0.8497
BEDS3	25,813.4	4.86	0.0083
TOTAL SUM OF SQUARES	956,345.2		
 <u>Parameter Estimates</u>			
<u>Intercept</u>	-1,716		-4.91
<u>Rural</u>	-349		-0.96
<u>Region</u>			
New England	1		0.00
Middle Atlantic	432		1.37
South Atlantic	283		0.78
East North Central	404		1.45
East South Central	645		0.97
West North Central	465		1.43
West South Central	-313		-0.88
Mountain	-37		-0.10
<u>Facility Type</u>			
Hospital	67		0.91
<u>Bedsize</u>			
Less Than 200 Beds	1,115		2.74
Between 200-700 Beds	895		2.96
$R^2 = 0.068$			

Definitions: URBAN = Urban/Rural location dummy
 REGION = Nine census divisions
 FACTYPE = Identifies facility as either a hospital or
 distinct-part unit
 BEDS3 = Three category bedsize variable: less than 200 beds;
 between 200 and 700 beds and over 700 beds.

Source: 1985-1987 PPS Exempt Hospitals and Excluded Units File.

variable can be found to be insignificant on the whole, yet any one category can be significant. For each set of variables there is an omitted category (urban, Pacific region, rehabilitation unit, and 700+ beds, respectively). As with all regressions, results are therefore sensitive to the left-out groups because the coefficients provide a statistical comparison only to these omitted categories.

Facilities with a bedsize less than 200 beds or between 200 and 700 beds are statistically significant explainors of TEFRA margins. Those with less than 200 beds, holding the other variables in the model constant, have an average TEFRA margin that is \$1,115 greater than that for hospitals with over 700 beds (the omitted group). TEFRA margins are \$895 higher on average for facilities between 200 and 700 beds compared to the over 700 bed group.

The model presented in Table 3-10 has an R-squared of just .068. This means that 6.8 percent of the total variance in HOSPGAIN is explained by the model. In order to try to explain more of the variation in HOSPGAIN, the same analysis of variance was performed on rehabilitation units with the inclusion of a teaching involvement variable called MAJORDUM, which is equal to one if the hospital has at least .25 residents per bed; otherwise zero. (This variable is not available for rehabilitation hospitals, and they were dropped from the analysis). Table 3-11 presents these results. For the main effects, both BEDS3 and MAJORDUM are significant contributors to the total sum of squares. The statistical significance of a variable in the main effects depends upon both that variable's overall contribution to the total sum of squares and its number of categories. For example, region, a nine category variable, contributes twice as much to the total sum of squares as BEDS3, a three category variable, yet is not statistically significant.

Coefficient estimates are reported in this table as well. Rehabilitation units in general hospitals with fewer than .25 residents per bed had significantly greater TEFRA margins. Units in hospitals with less than 700 beds were also likely to have greater margins.

As shown earlier in Table 3-8, the high-cost facilities in 1986 are less likely to have positive TEFRA margins than are the facilities with costs below

TABLE 3-11

ANALYSIS OF VARIANCE AND REGRESSION COEFFICIENTS FOR EXPLAINING HOSPITAL GAIN
(PAYMENT LESS AVERAGE COST), REHABILITATION UNITS, 1986

<u>Main Effects</u>	<u>Type III</u> <u>Sum of Squares</u> <u>(Thousands)</u>	<u>F Value</u>	<u>PR > F</u>
URBAN	1,881.9	0.65	0.4191
REGION	32,042.7	1.39	0.1990
BEDS3	16,250.2	2.83	0.0609
MAJORDUM	11,473.4	3.99	0.0467
TOTAL SUM OF SQUARES	871,441.8		
 <u>Parameter Estimates</u> <u>T Statistic</u>			
<u>Intercept</u>	-2,201		-5.03
<u>Rural</u>	-358		-0.81
<u>Region</u>			
New England	-62		-0.12
Middle Atlantic	545		1.46
South Atlantic	522		1.28
East North Central	395		1.29
East South Central	627		0.61
West North Central	606		1.71
West South Central	-518		-1.26
Mountain	-121		-0.31
<u>Bedsizes</u>			
Less Than 200 Beds	957		2.12
Between 200-700 Beds	738		2.24
<u>Teaching Involvement</u>			
Less Than 0.25 Residents Per Bed	675		2.00
R² = 0.073			

Definitions: URBAN = Urban/Rural location dummy
 REGION = Nine census divisions
 FACTYPE = Identifies facility as either a hospital or
 distinct-part unit
 BEDS3 = Three category bedsize variable: less than 200 beds;
 between 200 and 700 beds and over 700 beds.
 MAJORDUM = Teaching involvement. Equal to one if hospital has
 at least .25 residents per bed; otherwise = zero.

Source: 1985-1987 PPS Exempt Hospitals and Excluded Units File.

the median. Average cost is a product of length of stay and cost per day. In Table 3-12 we correlate HOSPGAIN, or TEFRA margin, with both average length-of-stay and cost per day. Results are presented for rehabilitation, long-term care and children's facilities for 1986 and 1987. (Results were unavailable for psychiatric facilities.) In 1986, LOS and cost per day are negatively associated with TEFRA margin for rehabilitation facilities. This means that the higher the average length-of-stay or cost per day of a facility, the smaller the TEFRA margins. In 1987, these correlations were much weaker.

Long-term care hospitals show no significant correlation between HOSPGAIN and LOS or cost per day, in either year. A possible reason for this poor correlation is there may be little variability in the LOS and cost per day for long-term hospitals. The primary determinant of a facility's success under TEFRA is how quickly its own costs rise relative to the TEFRA updates. Cost per day is only a static measure at a given point in time. The rate of increase in costs might be a better explainer of HOSPGAIN for long-term hospitals. Childrens' hospitals show a strong negative correlation between LOS and TEFRA margin variables in both years.

3.8 Summary and Conclusions

In 1986, facilities paid under TEFRA had cost per case that was, on average, at or below the target amount. This means that their rates of cost inflation were below the update factor, through 1986. Although, on average, costs were kept below the target amount, the majority of facilities (54.1 percent for rehabilitation) still had target amounts and therefore payment levels that were below average cost. The average facility loss per case was between 3 and 6 percent of their average cost.

In 1987, average cost rose faster than the update factors. The average facility loss per case grew both in an absolute sense and as a percentage of average cost. For rehabilitation and long-term care facilities the percentage loss per case rose from 3 and 4 percent, respectively, to over 6 percent of

TABLE 3-12

CORRELATION OF HOSPITAL GAIN WITH AVERAGE LENGTH-OF-STAY AND COST PER DAY, BY FACILITY TYPE, 1986

	REHABILITATION	LONG-TERM CARE	CHILDREN'S
1986			
Average LOS	HOSPGAIN -.31042 (.0001)	HOSPGAIN -.16583 (.2353)	HOSPGAIN -.84819 (.0001)
Cost Per Day	-.20775 (.0001)	.00092 (.9948)	.13673 (.4878)
1987			
Average LOS	HOSPGAIN -.23246 (.0001)	HOSPGAIN -.10315 (.4760)	HOSPGAIN -.50210 (.0055)
Cost Per Day	HOSPGAIN -.17520 (.0003)	HOSPGAIN -.16551 (.2557)	HOSPGAIN .06906 (.7219)

Note: Psychiatric facilities are unavailable for this table, see Cromwell, Harrow, and McGuire, 1989 for a correlation of TOTGAIN with Average LOS. Cost per day for psychiatric facilities, broken down by public or private hospital, or exempt unit.

Definitions: HOSPGAIN = TEFRA margin, Medicare payment per discharge less aver cost per discharge.

Source: 1985-1987 PPS Exempt Hospitals and Excluded Units file.

average costs. Childrens' and psychiatric facilities experienced an increase in their loss from 6 percent to 9 and 11 percent of average cost, respectively.

Although facilities under TEFRA have experienced negative TEFRA margins as their payment levels fall below their average costs, Medicare program costs have fallen as the result of TEFRA. TEFRA penalizes facilities dollar-for-dollar when costs exceed the target amount. On the other hand, the rewards for average costs below the target are only partial and are limited to 5 percent of the target. Thus, if over time average costs rise at some facilities and fall at others, Medicare gains. Medicare saves dollar-for-dollar where costs rise, and "loses" only partially through TEFRA incentive payments when costs fall.

While the average TEFRA margin was between \$-250 and \$-450 for 1986, a closer look at the distribution of margins across facilities reveals more information on TEFRA's impact. For example, twenty five percent of rehabilitation facilities in 1986 had an average loss per case that exceeded \$1,100, while, on the other hand, only ten percent of facilities experienced a gain of more than \$530 dollars. The maximum gain for rehabilitation facilities in 1986 was \$1,065.

Very large facilities, those with over 700 beds, are systematically doing worse in terms of their TEFRA margins as compared to smaller facilities. Rehabilitation facilities with over 700 beds, have an average TEFRA margin that is \$1,115 smaller per case than hospitals with less than 200 beds. Large teaching hospitals with rehabilitation units are also doing poorly under TEFRA. TEFRA margins are \$675 higher on average for rehabilitation facilities with .25 residents per bed or less compared to the over .25 residents per bed group.

Excluded facilities were more likely to have a positive TEFRA margin in both 1986 and 1987 if they had a high target amount. These high-target facilities in 1986 were uniformly high-cost institutions in 1982, the base year, and were better able to keep the rates of cost increase below the target amount than low target hospitals.

At least three conclusions can be made from this preliminary look at TEFRA's impact on excluded facilities. First, unless facilities are able to reduce their rate of cost inflation below the update factor, the TEFRA system will impose larger and larger losses over time as average costs continue to diverge from the base period amount.

Second, the asymmetric payment system is highly favorable to the Medicare program; more so, even, than the PPS system. Medicare saves by sharing in the profits when costs are below the target amount and in none of the losses when costs are above the target.

Third, high-target facilities are most likely to have positive TEFRA margins, indicating that those facilities with high base year costs may be getting rewarded for historical inefficiency. Either these facilities are lowering their casemix over the years 1982-1986 or their costs were excessive in 1982. Both explanations suggest that rebasing the target amount would be a good idea.

Over time facilities will experience even greater losses from the TEFRA system. It seems reasonable to suggest that rebasing some time in the near future, possibly coupled with more reasonable TEFRA update factors might help mitigate the facility losses and reduce the rewards that some facilities are now getting from historical inefficiencies.

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APPENDIX A

**DISTRIBUTION OF TARGET AMOUNT,
AVERAGE COST AND HOSPGAIN**

1986 AND 1987

FIGURE A-1

Long Term Care Hospitals
Distribution of Target Amount, 1986

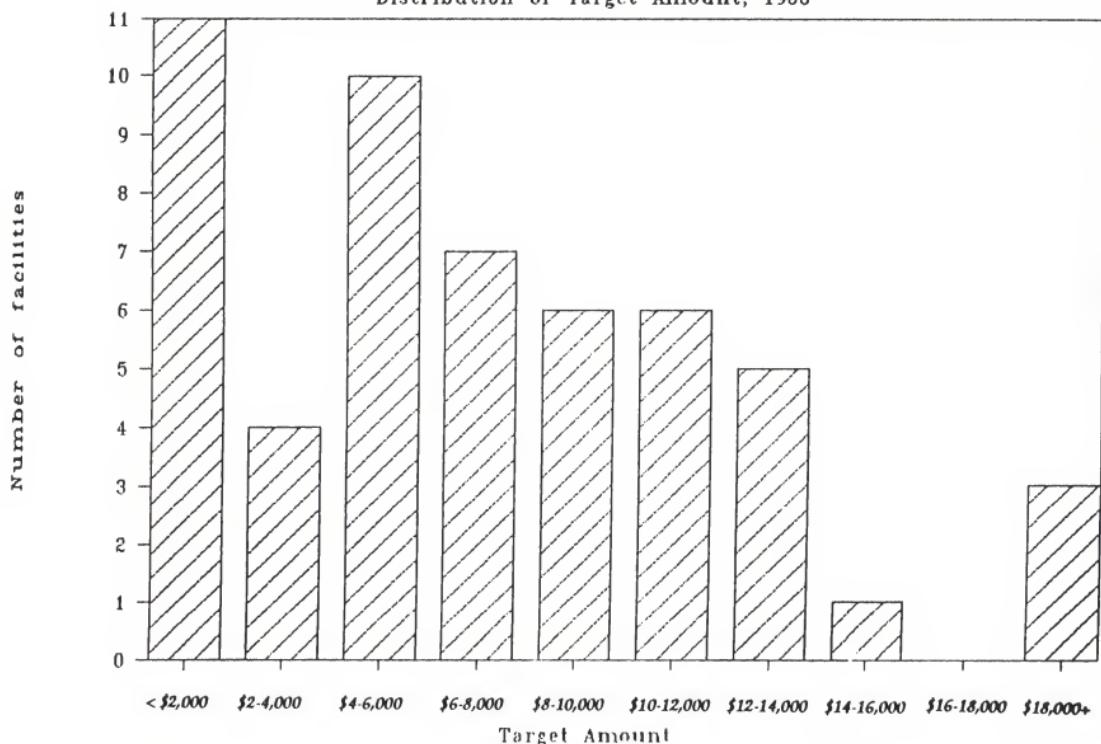


FIGURE A-2

Long Term Care Hospitals
Distribution of Target Amount, 1987

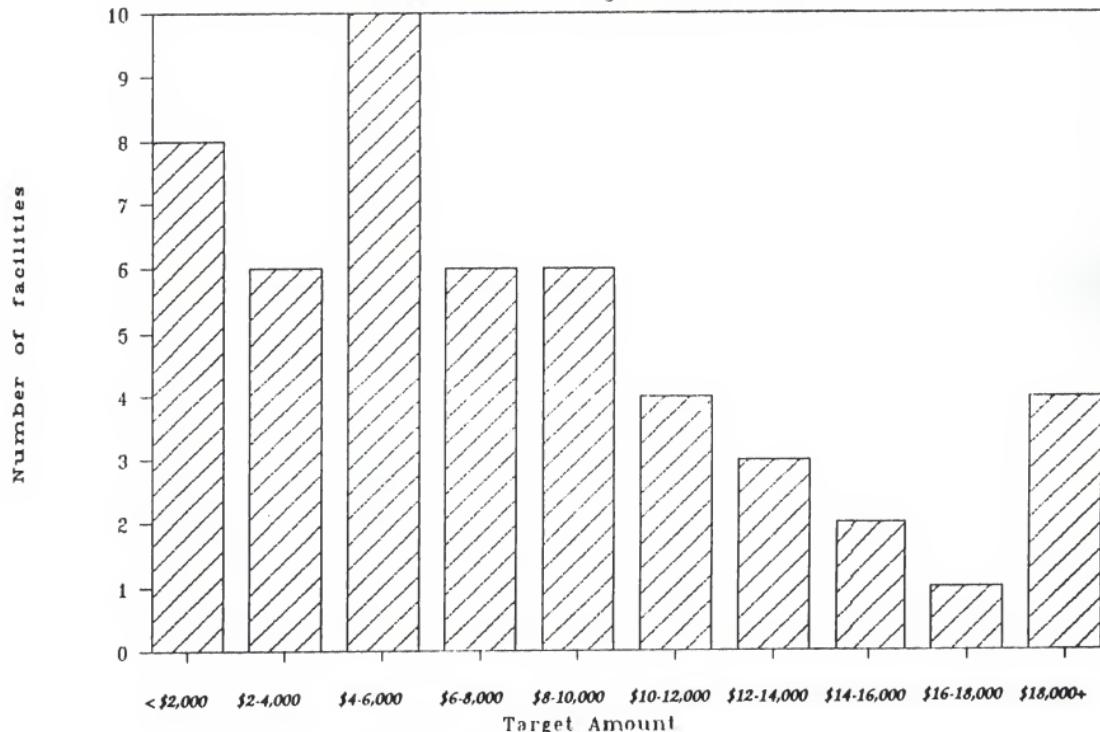


FIGURE A-3

Long Term Care Hospitals

Distribution of Average Cost, 1986

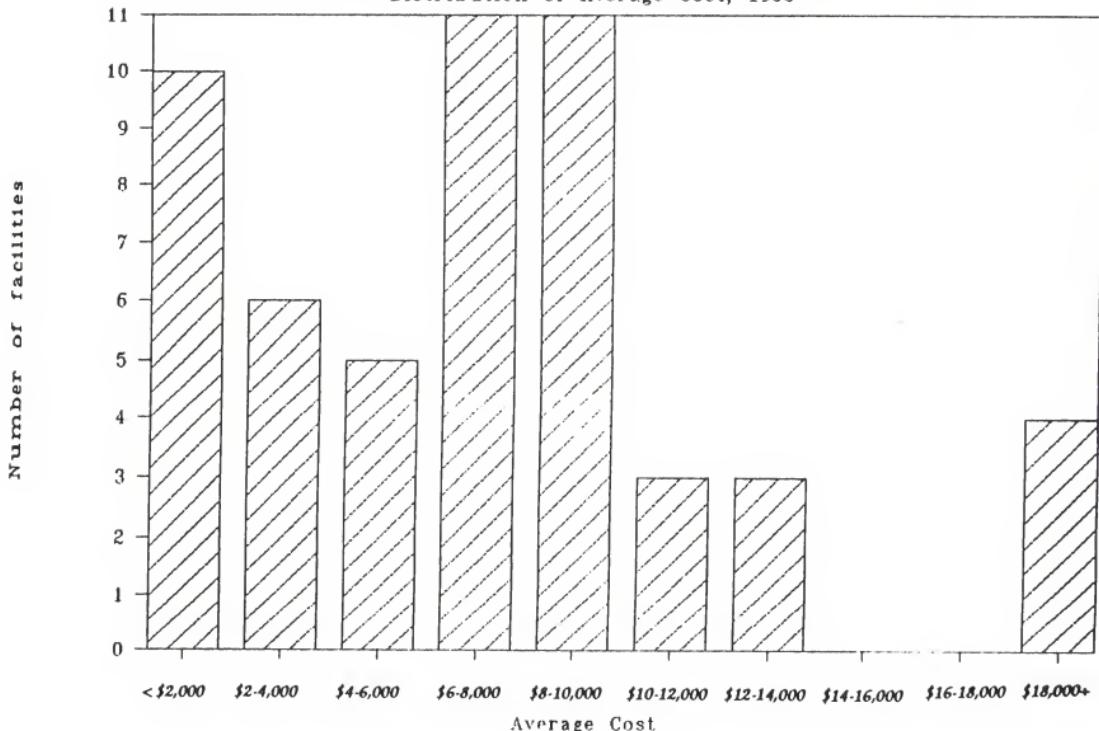


FIGURE A-4

Long Term Care Hospitals

Distribution of Average Cost, 1987

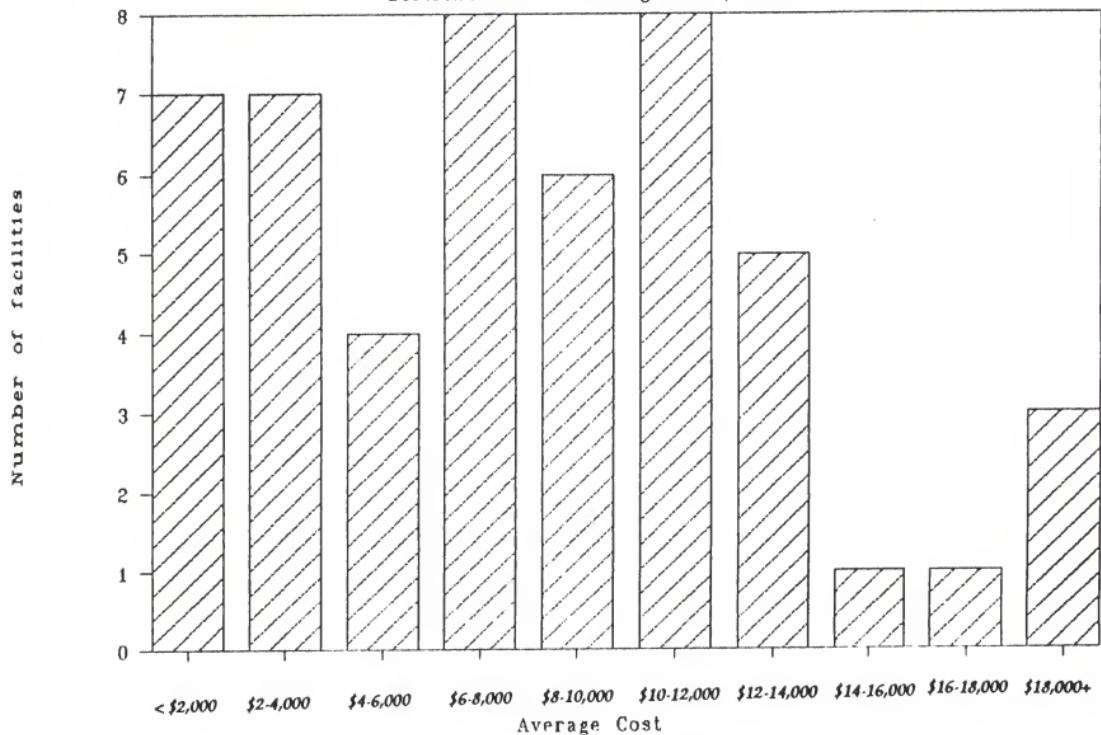


FIGURE A-5

Long Term Care Hospitals

Distribution of Hospital Gain, 1986

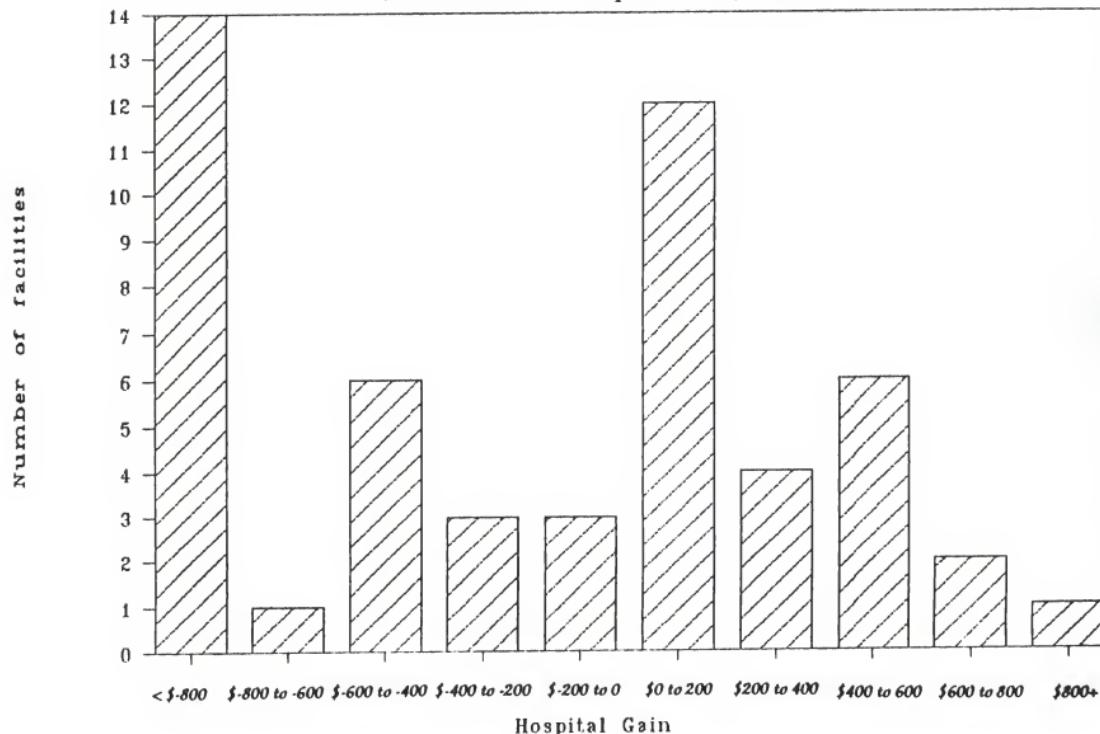


FIGURE A-6

Long Term Care Hospitals

Distribution of Hospital Gain, 1987

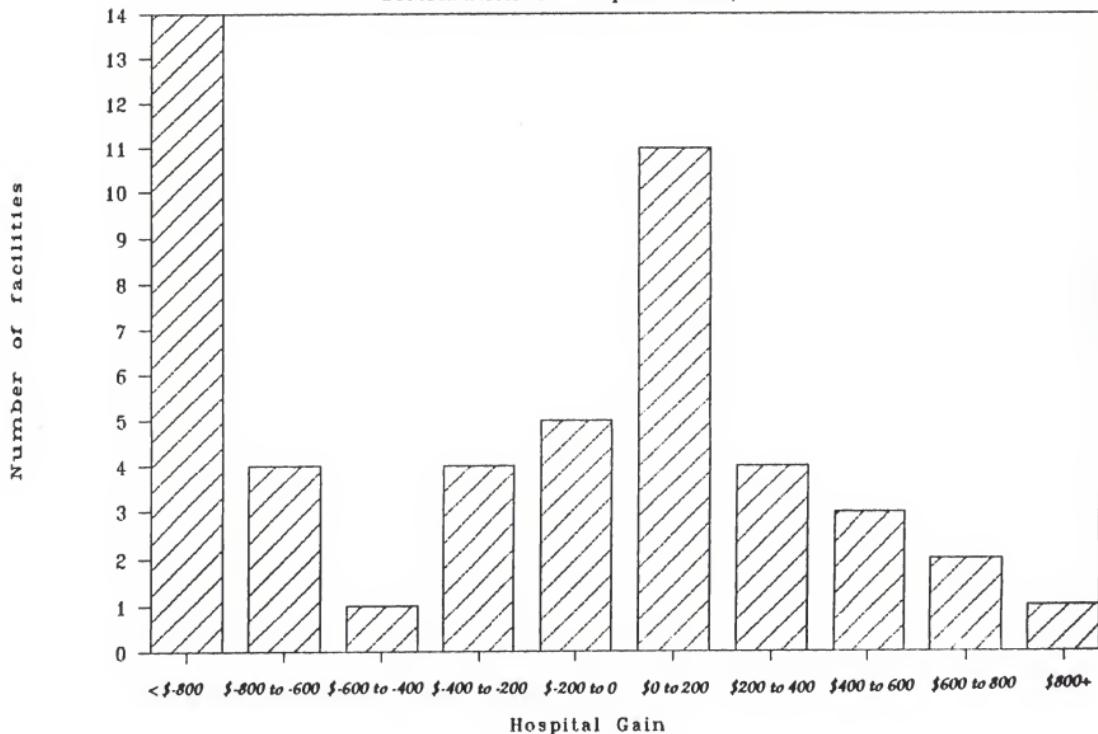


FIGURE A-7

Children's Hospitals
Distribution of Target Amount, 1986

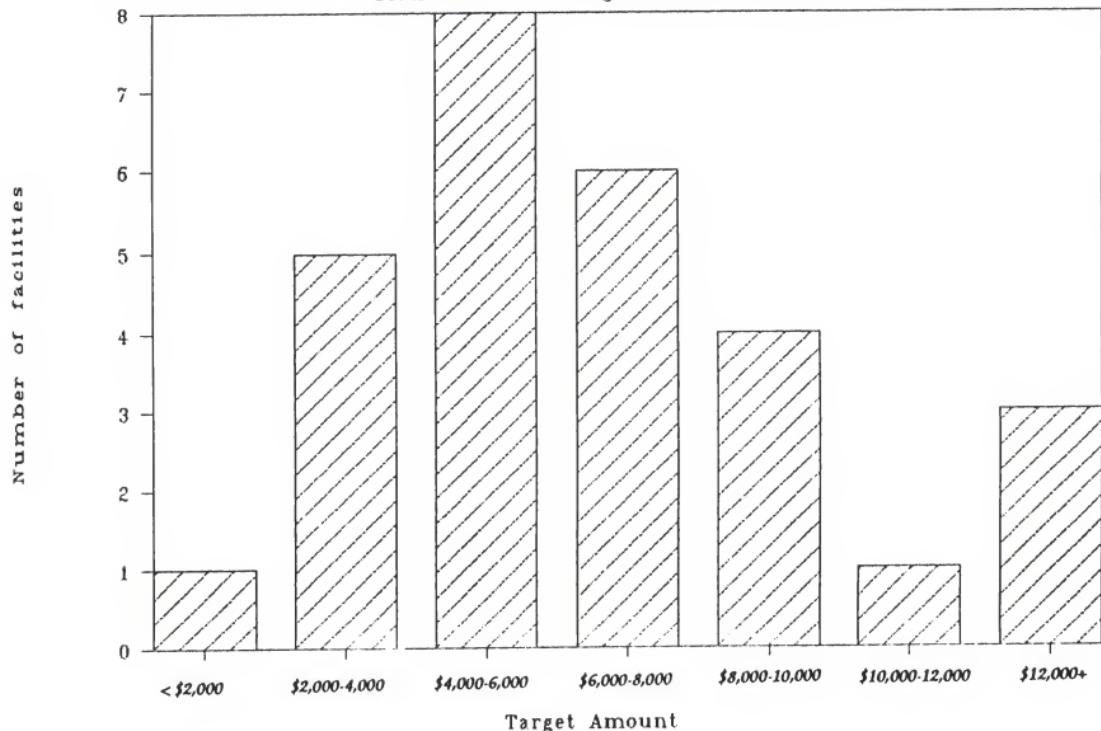


FIGURE A-8

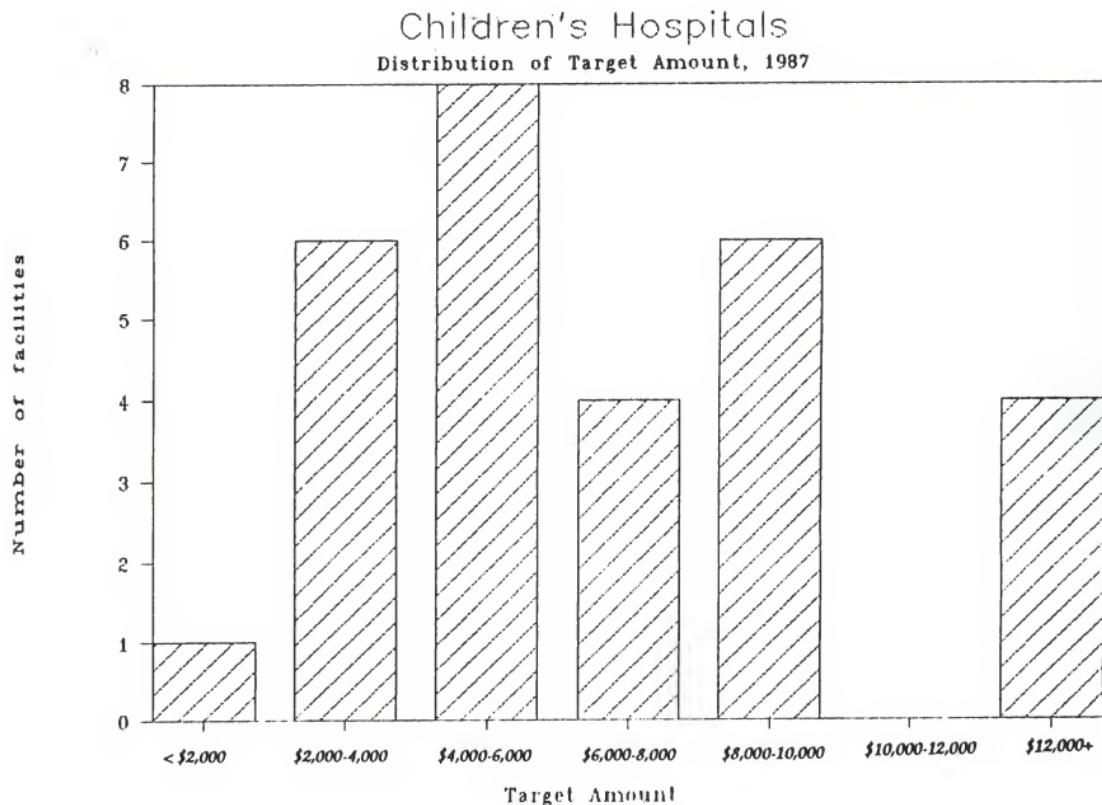


FIGURE A-9

Children's Hospitals

Distribution of Average Cost, 1986

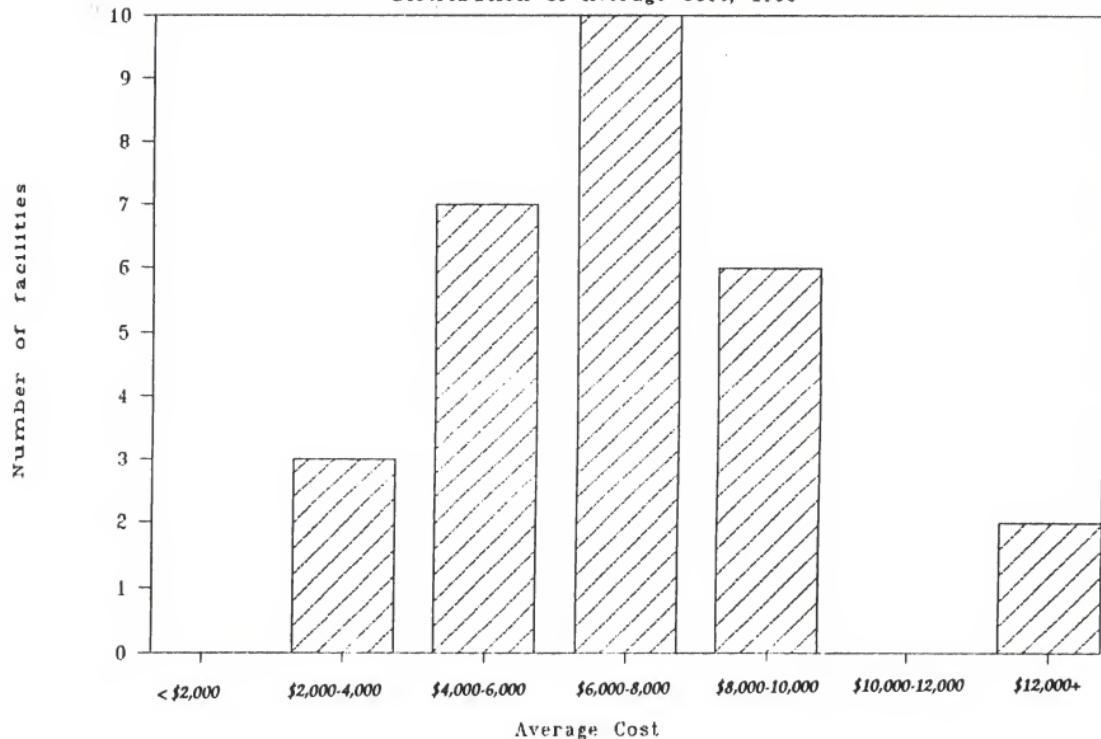


FIGURE A-10

Children's Hospitals
Distribution of Average Cost, 1987

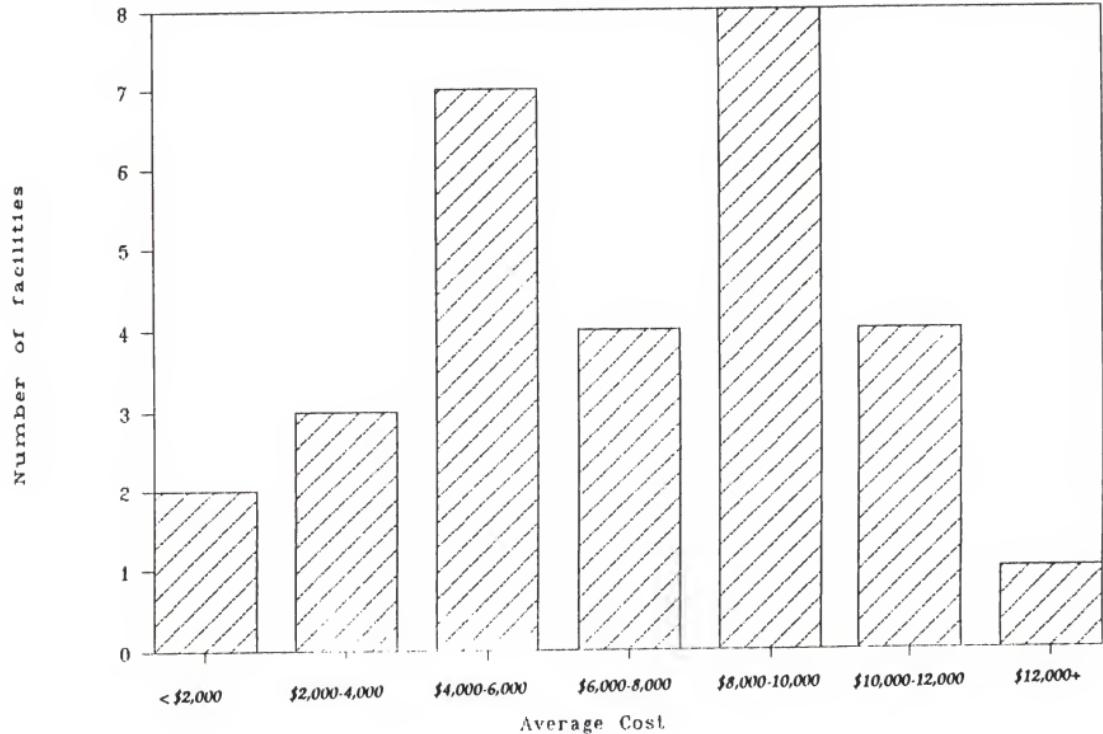


FIGURE A-11

Children's Hospitals
Distribution of Hospital Gain, 1986

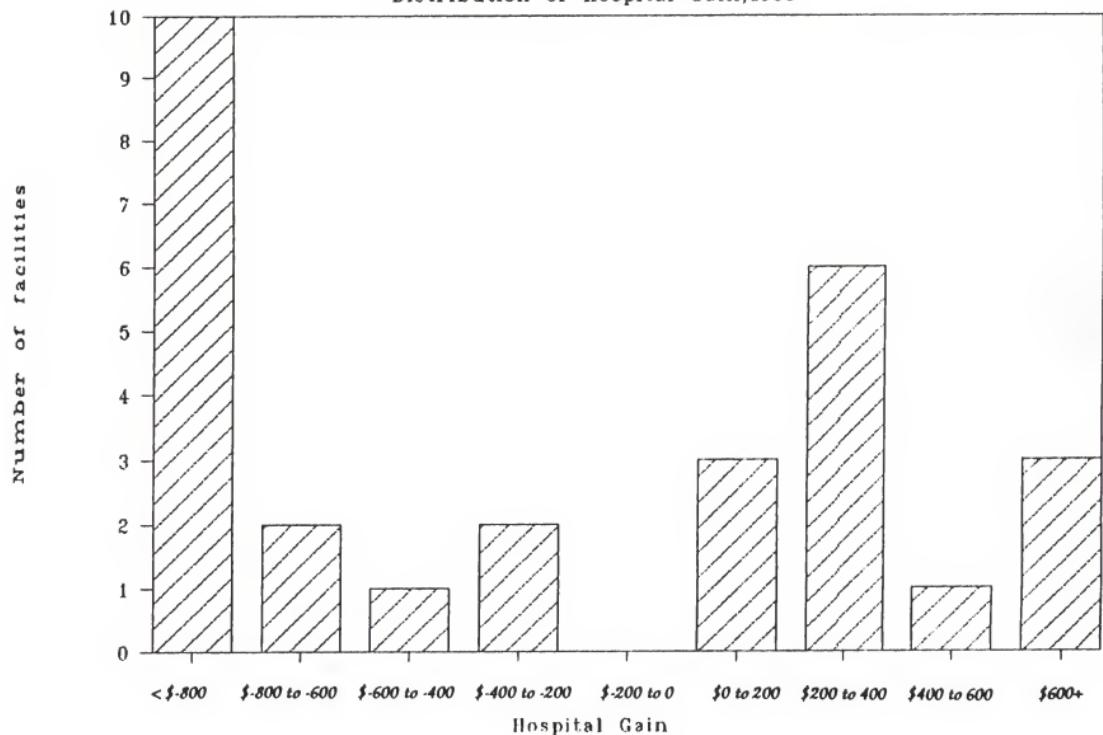
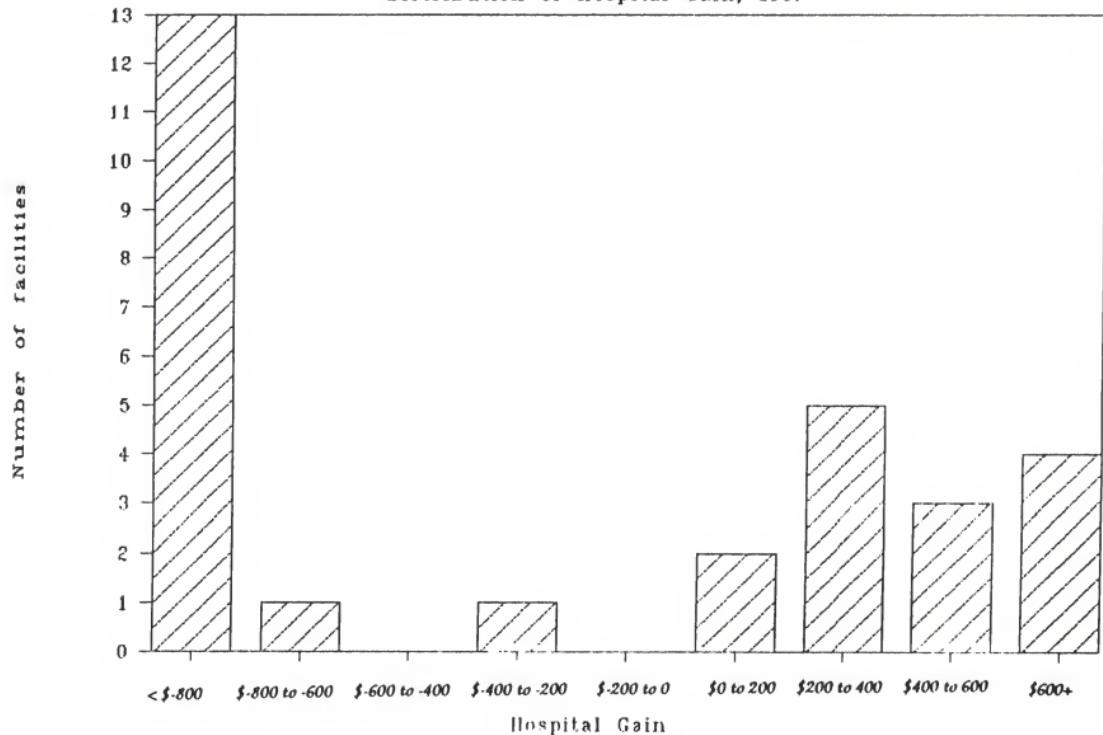


FIGURE A-12

Children's Hospitals
Distribution of Hospital Gain, 1987



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